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FROST, THOMAS, GUMM, SHAW

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Streptococcus of Septic Sore Throat*

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SINCE the first great American epidemics, which appeared in Boston in 1911 and Chicago in 1912, septic sore throat has been the subject of vital interest both to public health officials and to milk producers the country over. This is especially true because septic sore throat, even now, is erroneously quite generally regarded as an exclusively milk-borne disease.

Before this disease was recognized in its epidemic form in this country, it was well known in England and the Scandinavian peninsula.

Wherever and whenever the disease has appeared, streptococci have always been recognized as the probable etiological factor, but it was not until the work of Davis[1] in 1912 that a specific streptococcus was incriminated. His bacteriological study of this organism made it clear that the streptococcus of septic sore throat in the epidemics he studied differed in certain quite striking particulars from the hemolytic streptococci commonly found in tonsillitis and various other human infections. The value of Davis's work in thus differentiating the streptococcus of septic sore throat was not immediately recognized; in fact, even recent literature contains statements to the effect that the type of streptococcus may vary in different epidemics.

Brown, Frost and Shaw[2] in 1925 examined, by critical and differential methods, all of the cultures isolated from epidemics of septic sore throat, including the Boston and Chicago ones, so far as they were available. Their conclusions were that all of the various strains

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studied, some 11 in all, were identical so far as their tests showed; and that they corresponded with the organism originally described by Davis and named by him *Streptococcus epidemicus*. They also re-emphasized the fact that this streptococcus differs very strikingly and constantly from *Streptococcus pyogenes* in two major particulars, namely, that *Streptococcus epidemicus* possesses a striking capsule when examined in moist India ink preparations, and that its colonies are large, and moist, and have a tendency to grow on the surface.

DESCRIPTION OF STREPTOCOCCUS EPIDEMICUS

From the work that has been done on this organism[3] it may now be described as a streptococcus growing in short or long chains, surrounded—when viewed in a moist India ink preparation—by a capsule, the entire width of which is, on the average, equal to 3 of the organisms. This capsule, however, is not stained by the ordinary capsule stains.

On poured blood agar plates the colonies reach considerable size in 18 hours, and between 24 and 48 hours present their most characteristic appearance. In general, streptococcus colonies grow below the surface of the medium and are spherical or slightly lenticular in shape. Rarely small, thin colonies appear on the surface. But *Streptococcus epidemicus* colonies characteristically appear as surface colonies. They are large, moist and spreading, and to the uninitiated might not be recognized as streptococcus colonies at all. These surface colonies have a marked tendency to dry down if their incubation is prolonged beyond 48 hours. The deep colonies are large, long and flatly lenticular.

The colonies on a standard blood agar plate are strongly hemolytic, producing a clear hemolyzed area in from 24 to 48 hours, from 2.5 to 3.0 mm. in diameter. Twenty-four hours later this area may be nearly doubled in size.

In fluid mediums it produces complete hemolysis in 2 hours when tested by the U. S. Army method.[4]

When inoculated intraperitoneally with ½ c.c. of a 24-hour serum broth culture, it kills mice in from 7 to 48 hours.

This organism ferments dextrose, lactose, saccharose, and salicin, but not mannite. In dextrose broth it produces a pH not lower than 4.8. It does not ferment inulin or raffinose and is not bile soluble, but these tests probably have little or no value in differentiating streptococci. The same is true of cultures in broth and milk. This organism does not hydrolyze sodium hippurate as many of the bovine strains do.

THE CLINICAL ASPECTS OF SEPTIC SORE THROAT

It should, we think, be emphasized that this is a distinct disease, which etiologically, clinically and pathologically can be recognized as an entity; that public health officials should recognize it as a distinct communicable and reportable disease and urge the physicians in their constituencies to take the possibility of this disease into consideration when they are called to treat cases of severe sore throat, especially in adults, and also to bear in mind the possibility of confusing this disease with atypical cases of scarlet fever and influenza. It seems certain that sporadic cases of septic sore throat frequently and continuously exist. So far as we are aware, there is no literature on this phase of the subject.

EPIDEMICS OF SEPTIC SORE THROAT

From 1880 to 1905 there were described 18 epidemics in England, 1 in Norway in 1908, and, since the first epidemic in this country at Cambridge, Mass., in 1908, 52 in the United States reported as being milk-borne.[5, 6] One hospital epidemic has been described as being spread by contact,[7] and recent reports from the Massachusetts State Board of Health[8] have recognized an increasing number of cases of septic sore throat not milk-borne.

In the light of our present knowledge, the causal relationship of milk to streptococcic sore throat has been satisfactorily demonstrated in comparatively few American epidemics, although there is little reason to doubt that, if what we now regard as the proper bacteriological methods had been used in their study, the epidemiological relationships would have been made clear in most if not all of them.

ETIOLOGICAL RELATIONSHIPS

There are commonly found in milk, pasteurized as well as raw, streptococci which upon a cursory examination might be confused with the etiological agent of this disease. It is even now a common practice in medical literature to refer to all hemolytic streptococci as *Streptococcus hemolyticus* on the supposition that they are all the same. As very clearly pointed out in his admirable monograph on the use of blood agar for the study of streptococci, J. Howard Brown makes it clear that hemolysis is a property common to very different streptococci, which may be separated into several quite distinct types or species. Unless, then, in the discussion of any epidemic of septic sore throat it is actually shown that *Streptococcus epidemicus* is present, the investigations have little value.

The presence of hemolytic streptococci in raw milk, in interepi-

demic periods, has been studied by a number of investigators. Davis,[9] for example, found hemolytic streptococci in 85 out of 328 samples, or approximately 26 per cent of those examined. Ayers and Mudge[10] isolated streptococci from 38 per cent of the cows examined by them, but did not indicate their action on blood. Frost and Bachmann[11] examined individual samples from 412 cows and found hemolytic streptococci of the beta type in 28 per cent of them. The mere presence of hemolytic streptococci in milk can have no significance in the epidemiology of septic sore throat, since they are always found in high grade raw milk; frequently found in pasteurized milk; and we believe they are quite as common in the poorer grades of raw milk, although there is considerable difficulty in demonstrating them due to the fact that other bacteria present make it necessary to dilute the sample far beyond that point which is ordinarily used in demonstrating them in the better grades of milk.

In the investigations of many of the past epidemics of septic sore throat, the finding of a cow suffering from streptococcic mammitis has been taken as sufficient evidence of the fact that the milk from such a cow was the cause of the epidemic, but we believe that there is no evidence that ordinary bovine mastitis is the cause of septic sore throat—or any human disease for that matter. The cause of mastitis in cattle is not always streptococci, but, even when it is, these are very rarely of the "epidemicus" type, and hence cannot be the cause of the disease. Furthermore, mastitis in cattle is such a common disease that it would be difficult to associate septic sore throat, which occurs so rarely, with this disease in cattle, which is so commonly and universally present.

To account for milk-borne septic sore throat, it is necessary to assume that the causal organism is present in the particular milk in quantities sufficient to infect.

It is quite evident that this organism may enter the milk in two ways. It may get into the milk from the milker or others who handle it, after it is drawn from the cow, or it may come directly from cows suffering from a mastitis caused by *Streptococcus epidemicus*, or from cows which are, at least, carriers of this organism. The relative importance of the probable source of this organism in milk has been ably discussed by previous workers, especially Smith and Brown,[12] in which they come to the conclusion:

> The grafting of human streptococci upon the udder, their multiplication under ideal conditions in the warm fresh residual milk, and their discharge twice daily into the milk at milking time, offers a much better explanation of the continuance of milk-borne epidemics over a number of days than any single infection of the

milk through coughing, sneezing, spitting, and tasting. Such accidents may indeed infect the milk, but the infection could hardly last over a day and might be diluted to ineffectiveness in a very large supply. Such accidents would be more potent in a very small dairy.

We may add that such accidents could not logically be thought of as the cause of large epidemics.

"EPIDEMICUS COWS"

For a period of about 4 years the authors have been taking regular monthly samples from the 8 herds (about 1,200 cows), supplying the Chicago district with certified milk, and typing the streptococci in an effort to determine whether *Streptococcus epidemicus* was present, and, if so, its source. Our method of procedure has been to milk a string of 10 cows into a 2-ounce bottle. In doing so, we have discarded the first stream of milk from each quarter and collected the second. These samples have been iced and sent to the laboratory as soon as possible. From the more distant farms this has sometimes been an overnight journey. Each composite sample has been diluted 1 to 20 and plated in veal infusion agar to which 7 per cent of defibrinated horse blood has been added. The incubation temperature has been 37° C. and the time from 18 to 48 hours. If suspected streptococci are found in any of these composite samples, samples from the individual cows composing the string in question are taken and examined by the same routine.

It has been found that streptococci which give a beta zone of hemolysis are very common in these samples, and under the old term would have been regarded as *Streptococcus hemolyticus*. By applying the various tests mentioned in the description of *Streptococcus epidemicus* above, it has been found that there are 4 types or species into which these beta hemolytic streptococci can be classified. In the order of the frequency with which they occur they are: *Streptococcus mastitidis*, *Streptococcus infrequens*, *Streptococcus asalignus*, and a small unnamed group differing only slightly from the last. None of these streptococci would be readily confused with *Streptococcus epidemicus*. They are without doubt of bovine origin and are apparently only infrequently connected with mastitic disturbances. They appear to live on the milk rather than on the tissue of the udder.

We have occasionally found *Streptococcus epidemicus* in our group samples, and have been able to identify the cows shedding them. In all we have seen and studied more or less completely 17 cows. Eight of these were found in certified milk herds supplying the Chicago district; 2 were found in connection with an epidemic of septic sore throat (Frost and Carr[18]); and the other 7 were discovered from time to time

as samples of milk were referred to us from the Veterinary Science Department of the University of Wisconsin. In the 8 cows found on the certified milk farms 1 was suffering from a clinical mastitis at the time of discovery and 2 others, which were under study a considerable period of time, later developed pathological conditions which would probably have been recognized by a clinical examination. It is very evident from our work that by means of this monthly examination we are able to pick out cows which may be shedding *Streptococcus epidemicus* in large numbers, which would not have been excluded from the herd, for a considerable time at least, by even the most careful clinical examination. In most of these "epidemicus" cows, there was such a slight abnormality in the udder and the milk that it had escaped the attention of the milkers even though a stripping cup was used.

So far as the 8 cows of the certified milk herds were concerned, they had all recently been brought to the farms, and we have no knowledge of how they became infected. We were unable to obtain any data on the 7 other cows, but the 2 concerned with a small epidemic of septic sore throat were associated with a milker in whose throat we found *Streptococcus epidemicus*.

In regard to the quarters infected, in 4 of the 17 it was undetermined; in 7, only one quarter; in 4, two quarters; and in 2, three quarters of the udder were infected.

We have gone on the supposition that the source of infection was from man, and since Davis has shown that in his experimental work an injury to the udder tissue was necessary for infection, it was interesting to note that a considerable number of these cows had either sores or scars on their teats or udders.

EXAMINATION OF EMPLOYEES' THROATS

To guard against the possibility of cows becoming infected on the certified milk farms, as well as to protect the milk from infected handlers, a monthly examination of throat swabs from the employees on all the farms in the Chicago district for *Streptococcus epidemicus* has been carried on simultaneously with the examination of the milk samples. The examinations are made in the same way. The swabs are covered with about 2 c.c. of veal infusion broth, either at the farm or as soon as they are received at the laboratory. In the latter case they are incubated for about 2 hours, and then a single loop of this broth is introduced into a tube of fluid blood agar and poured into petri dishes, so that we are able to get the same poured plates as in the milk samples.

The results obtained during the first 2 years were reported by Dr.

Clarence C. Saelhof." During the latter half of the period covering 20 months, 1,996 cultures have been examined from 438 different men. Of these about one-fourth, or 115 men, were carrying streptococci which gave beta hemolytic colonies. Fourty-four men gave these cultures with such regularity that they might be considered as carriers. The remaining 72 gave positive results only occasionally.

There have been 7 different types of beta hemolytic streptococci found: *Streptococcus pyogenes* in 66 men, *Streptococcus anginosus* in 35, *Streptococcus mastitidis* in 17, *Streptococcus equi* in 8, *Streptococcus subacidus* in 7, *Streptococcus infrequens* in 6, and *Streptococcus epidemicus* in 6.

Streptococcus epidemicus has been identified in the throats of 3 men by Saelhof and in 6 by us. In only 1 man, however, has it been possible to obtain more than the first culture because, with this 1 exception, the men have left the farm upon hearing of the results. In the 1 case mentioned we were able to get several cultures. He was immediately sent off the farm and visited by a physician who made the cultures. He had a clinical sore throat but it was never diagnosed as septic sore throat. After recovery, his tonsils were removed and later several cultures were made which were all negative. He was allowed to return to the farm, but was observed on two occasions going to his room when the doctor visited the farm for the purpose of making swabs and gargling his throat. For this attempted evasion of an examination, he was promptly discharged, but soon reappeared on another of our certified milk farms, in another state. Two examinations from him at this place were negative, but as soon as his identity was discovered, he was again discharged. We have never found *Streptococcus epidemicus* in the milk of either of the farms where this man worked, nor have we ever found "epidemicus cows" on the farms where *Streptococcus epidemicus* has been found in the throats, with 2 exceptions, where the cultures from the throats were obtained a year or more after the infected cows were found.

HOW SAFE DO THESE TESTS MAKE RAW MILK?

The facts determined in these investigations suggest that the methods proposed, largely by Brown and his coworkers, enable us to differentiate human hemolytic streptocci of the beta type from those commonly found in milk.

The *Streptococcus epidemicus* cultures which we have occasionally found in milk correspond in all particulars with the cultures of this organism from the various human epidemics from which cultures are available.

These cultures of *Streptococcus epidemicus* have always been traced to particular cows which we were able to identify promptly and remove. So far as our evidence goes, these cows have always been infected with this organism, and were not merely furnishing in the milk cistern of the udder the culture medium. They have been found in all stages of infection. On the certified milk farms we have always detected them in the early stages, and 6 of the 8, when first found, showed no clinical symptoms of mastitis or detectable changes in the fresh milk, but such of these cows as we have been able to study have later developed mastitis which led to profound tissue changes. It would seem that cows suffering from an infection with a human streptococcus are not by any means rare, at least in certain dairy sections of the country. There may be, for example, a large number of these cows in the dairy regions of Massachusetts, New York and Connecticut, where 41 of the 52 epidemics of septic sore throat in this country have appeared, while only 3 have been reported from Illinois, 2 each from Vermont and Wisconsin, and 1 each from Maryland, New Hampshire, Oregon and Pennsylvania.

Granting that our method of examination is as satisfactory as it appears to be in our hands, and granting that certified milk farms do not introduce cows into their milking lines unless they have been shown to be free from infections with *Streptococcus epidemicus*, or carriers of this organism, and granting further that by throat examinations of the milkers and dairy employees to be sure that they are not harboring this organism, and providing that the milk from individual cows or small groups be examined on blood agar plates at frequent intervals to detect dormant carriers, it would seem that the danger of milk-borne septic sore throat could be eliminated from such milk with a high degree of certainty.

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Effect of Broken Home on Quality of School Work

IN a study of 4,000 public school children in Germany, most of them 10 to 14 years old, the author, who some time ago made a study of the effect of economic condition on the quality of school work, concludes that the absence of one or both parents has an unfavorable effect on the child's school work.

The author finds that retardation, that is, failure to be promoted, is 50 per cent more frequent among children from incomplete families than among children from normal families. (An incomplete family is one that has been disrupted by the death of one or both parents or by divorce, or in which the mother is unmarried.) Particularly bad was the situation among children who had lost their fathers, among whom retardation was 70 per cent more frequent than among children having both parents.

In seeking the causes of this situation the author takes up the relative importance of inherited physical or mental inferiority and unfavorable environment in different types of cases. He is of the opinion that among children one or both of whose parents died at an early age inherited physical inferiority probably was a factor in the retardation. He thinks that inherited mental inferiority may have been present in the children of unmarried mothers, particularly when the mother had more than one child of illegitimate birth, and that children of divorced parents may have inherited certain defects that were responsible for the divorce of the parents. He finds that in every case lack of proper supervision, due to the absence of one or both parents, had affected the quality of the child's school work.—*Zeitschrift für Kinderforschung*, Berlin, 33, May 22, 1929, p. 517.

Endemic Goiter in Louisville and Jefferson County Schools

With Evidence of Family History, Defective Teeth, Tonsils, Chest Expansion, and Use of Iodized Salt

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AMONG the profession as well as the laity, there seems to be an impression that endemic goiter is relatively infrequent in Kentucky, especially in the lowland counties, and that, when found, it is in families that have moved into those counties from goitrous belts.

In order to obtain some facts about the prevalence of endemic goiter in Louisville, Ky., a survey was made of the girls in Louisville city high schools and 8th grades, and of both boys and girls between 10 and 19 years of age in 9 schools in Jefferson County. Among a total of 5,083, there were found 677 cases of goiter; that is, 13.32 per cent of all examined had adolescent goiter. The work was done between February 1 and May 1, 1928.

All examinations were made by the same person in order that the findings might be comparable to others, and according to standards used by Olesen and Kimball. The goiters were recorded: very slight, slight, medium–large, and adenoma, following the classification by Kimball in the Akron survey. The usual methods of inspection and palpation were employed.

TABLE I

TYPES OF GOITERS

Types	City		County		Combined Total	
	Number	Per cent of all cases	Number	Per cent of all cases	Number	Per cent of all cases
Very slight	210	34.6	7	10.0	217	32.0
Slight	356	58.7	56	80.0	412	60.9
Medium–Large	29	4.8	4	5.7	33	4.9
Adenoma	12	1.9	3	4.3	15	2.2
Totals	607	100.0	70	100.0	677	100.0

Table I gives percentages based on the total number of cases examined in each separate group, for both city and county.

In this table it is interesting to note, 21.3 per cent greater incidence of slight adolescent or typical diffusely enlarged goiter in the county than in the city, and 2.4 per cent greater incidence of adenomata in the county. This may lead one to infer that either the type of life in the country has an effect, or that there is a greater familial incidence of goiter among the county cases than the city.

If there is a familial tendency, let us see if those that have goiters come from goitrous families or from goitrous districts.

TABLE II

RESIDENTS BORN OUT OF STATE

Type	City			County			Combined Totals		
	Born in the State	Born out of State	Total	Born in the State	Born out of State	Total	Born in the State	Born out of State	Total
Goiter.....	534	73	607	64	6	70	598	79	677
Per cent..	88.0%	12.0%	100.0%	91.4%	8.6%	100.0%	88.3%	11.7%	100.0%
Non-Goiter..	3,188	537	3,725	613	68	681	3,801	605	4,406
Per cent..	85.6%	14.4%	100.0%	90.0%	10.0%	100.0%	86.3%	13.7%	100.0%
Total cases..	3,722	610	4,332	677	74	751	4,399	684	5,083

There are 2.0 per cent more non-goiters born out of the state than goiter cases, while 3.4 per cent more goiter cases in the city were born out of the state than in the county.

It is interesting to note that 90 per cent of the goiter cases who were born out of the state and later moved into Kentucky were born in Indiana and Tennessee, which states are out of the goiter belts; while only 67 per cent of the non-goiters came from these states. This shows that cases of goiter found here arise, not from those who have lived in goitrous belts, but from native born families.

Table III clearly demonstrates the familial relationship of goiter; 22.1 per cent of the cases having a goiter gave a family history of goiter. Of these, in 60 per cent the mother had a goiter, and in 20 per cent a sister. Only 7.4 per cent of the non-goiters gave a family history of goiter, the mother being affected in but 46 per cent of this group. The family history of goiter is 10.4 per cent higher in the county schools than in the city schools. This throws some light on the findings in Table I, in which it appears that despite a more open air life and better hygiene in the country, there is a greater percent-

TABLE III

FAMILY HISTORY OF GOITER

Relative	City				County				Combined Total			
	Non-Goiter		Goiter		Non-Goiter		Goiter		Non-Goiter		Goiter	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
Mother	126	47.0	77	60.1	24	41.4	13	59.1	150	46.0	90	60.0
Father	9	3.4	4	3.1	3	5.2	.....	.....	12	3.6	4	2.6
Sister	54	20.1	26	20.3	14	24.1	4	18.2	68	20.8	30	20.0
Aunt	43	16.1	20	15.7	9	15.5	1	4.5	52	16.0	21	14.0
Grandmother	24	9.0	1	0.8	2	3.5	2	9.1	26	8.0	3	2.0
Cousin	10	3.7	.....	.....	1	1.7	1	4.5	11	3.4	1	0.7
Brother	2	0.7	.....	.....	5	8.6	1	4.6	7	2.2	1	0.7
Totals	268	100.0	128	100.0	58	100.0	22	100.0	326	100.0	150	100.0
Percentages	7.1		21.0		8.5		31.4		7.4		22.1	

age of adenoma and definite adolescent goiter. Also, the familial relationship is greater in the county schools.

In this climate the average age for the beginning of menstruation is 13 years. It is before or about this time that adolescent goiter usually appears; in the goitrous district it appears much earlier.

TABLE IV

AGE INCIDENCE

Age	City				County				Combined Total			
	Non-Goiter		Goiter		Non-Goiter		Goiter		Non-Goiter		Goiter	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
10	21	0.6	.....	.....	126	18.5	9	12.9	147	3.3	9	1.3
11	59	1.6	5	0.8	106	15.5	9	12.9	165	3.7	14	2.1
12	304	8.2	27	4.5	141	20.7	14	20.0	445	10.1	41	6.1
13	560	15.0	88	14.5	94	13.8	15	21.4	654	14.8	103	15.2
14	854	22.9	131	21.6	94	13.8	11	15.7	948	21.5	142	20.9
15	888	23.8	151	24.9	63	9.3	7	10.0	951	21.7	158	23.4
16	602	16.2	117	19.2	47	6.9	4	5.7	649	14.7	121	17.8
17	349	9.4	63	10.4	10	1.5	1	1.4	359	8.2	64	9.5
18	78	2.0	17	2.8	.....	.....	.....	.....	73	1.8	17	2.5
19	10	0.3	8	1.3	.....	.....	.....	.....	10	0.2	8	1.2
Total	3,725	100.0	607	100.0	681	100.0	70	100.0	4,406	100.0	677	100.0

Table IV shows that in the city 24.9 per cent of the goiters were found at age 15 years, which is later than the average beginning of adolescence in this climate, while in the county 21.4 per cent were found at the age of 13. There were 12.9 per cent more goiters found in the county at 10 years of age than in the city. None were found in the city at this age. The more rapid physical development of the country children may explain the earlier development of goiter in this group.

TABLE V

WEIGHT INCIDENCE

	City				County			
	Non-Goiter		Goiter		Non-Goiter		Goiter	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
Normals	1,499	40.3	250	41.1	339	49.8	23	32.9
7–10% Underweight	386	10.4	61	10.4	86	12.6	14	20.0
10–20% Underweight	902	24.3	155	25.4	141	20.7	22	31.4
Over 20% Underweight	186	4.9	56	9.2	20	2.9	4	5.7
7–10% Overweight	165	4.4	27	4.4	33	4.9	1	1.4
10–20% Overweight	344	9.2	31	5.1	40	5.9	4	5.7
Over 20% Overweight	243	6.5	27	4.4	22	3.2	2	2.9
Totals	3,725	100.0	607	100.0	681	100.0	70	100.0

Children from 7 per cent overweight to 7 per cent underweight were considered within the normal zone. Only 40 per cent of those examined were within this zone, the group being about equally divided between the goiters and non-goiters. However, in the county schools, there were 16.9 per cent more non-goitrous children within the normal group than goiter cases.

The significant point is that in the city there were 4.3 per cent more goiter cases in the over 20 per cent undernourished group than non-goiter cases. In the county the ratio of goiters to non-goiters in the undernourished group is more pronounced. The greatest number of overnourished children were in the non-goiter group.

Dental conditions were classified as to tartar; tartar and cavities; and tartar, cavities and gingivitis; or extreme dental neglect.

The presence of dental decay does not necessarily imply focal infection, but it is reasonable to assume that focuses of infection are more possible with poor teeth than with good and well cared for teeth.

TABLE VI

TEETH

Dental Conditions	City				County				Combined Total			
	Non-Goiter		Goiter		Non-Goiter		Goiter		Non-Goiter		Goiter	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
Tartar	833	63.0	202	61.7	178	57.8	26	70.3	1,011	62.0	228	62.4
T-Cavities	420	31.7	107	32.6	123	39.9	11	29.7	543	33.3	118	32.3
T-Gingivitis	68	5.3	19	5.7	7	2.3	.....	.....	75	4.7	19	5.3
Totals	1,321	100.0	328	100.0	308	100.0	37	100.0	1,629	100.0	365	100.0
Percentages	35.4		48.4		45.2		52.8		36.9		53.9	

Missing and filled teeth were not classified because of insufficient time, but one may assume that the usual reason why teeth were filled or removed was that they had been points of disturbance, though these steps may have been taken before systemic infection started. Missing teeth were more probably a cause of infection than filled teeth, for teeth are usually removed when they cannot be properly filled. These points as possible causes of thyroid enlargement will be discussed later.

There were 13 per cent more dental disorders among the goiters than among the non-goiters in the city, with only a 7.6 per cent greater number of dental defects between the two classes in the county. There were 9.7 per cent fewer dental defects among the goiters in the

TABLE VII

TONSILS

	City				County				Combined Total			
	Non-Goiter		Goiter		Non-Goiter		Goiter		Non-Goiter		Goiter	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
Out	1,133	30.5	144	23.8	174	25.5	27	38.7	1,307	29.6	171	25.4
Submerged	980	26.3	141	23.3	139	20.4	9	12.9	1,119	25.4	150	22.1
Medium	1,115	29.9	206	33.9	288	42.3	25	35.5	1,403	31.8	231	34.1
Large	497	13.3	116	19.0	80	11.8	9	12.9	577	13.2	125	18.4
Totals	3,725	100.0	607	100.0	681	100.0	70	100.0	4,406	100.0	677	100.0

city than in the county. Can one explain this difference in the dental hygiene as due to more close attention to health habits in the city schools?

As only the girls were examined in the city, no comparison could be made there; but in the county the dental hygiene among the boys was 4 per cent higher than among the corresponding number of girls. The cases with larger goiters had the most extreme grades of dental neglect.

Tonsils are usually removed because of suspected or existing disease, and while enlarged tonsils do not necessarily indicate a source of infection, yet some of the enlargements may be the result of infections.

The classification of tonsils as: out, submerged, medium, and large, is to indicate degrees of hypertrophy, and not to infer that they are focuses of infection.

TABLE VIII

CHEST EXPANSION

Inches expansion	City				County				Combined Total			
	Non-Goiter		Goiter		Non-Goiter		Goiter		Non-Goiter		Goiter	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
1	24	0.06	3	0.04	9	1.5	4	0.07	33	0.7	7	1.0
1½	189	5.0	49	8.9	70	10.27	11	16.9	259	5.8	60	8.8
2	928	24.9	146	24.0	218	32.0	21	31.5	1,146	26.0	167	24.6
2½	772	20.9	130	21.7	92	13.6	12	19.8	864	19.7	142	20.9
3	1,134	30.6	164	27.0	186	27.4	17	25.8	1,320	29.9	181	26.9
3½	384	10.5	60	9.9	48	7.3	4	5.9	432	9.8	64	9.6
4	241	6.5	38	6.5	55	7.9	1	0.03	296	6.8	39	5.7
4½	39	1.5	12	1.9	3	0.03	.....	.....	42	0.9	12	1.8
5	14	0.04	5	0.06	.....	.....	.....	.....	14	0.4	5	0.7
Totals.....	3,725	100.0	607	100.0	681	100.0	70	100.0	4,406	100.0	677	100.0

There were 5.7 per cent more large cryptic tonsils among the goiters than among the non-goiters in the city, and only 1 per cent more large cryptic tonsils among the county goiter cases. The larger goiters were predominantly associated with large cryptic tonsils, and also the more severe grades of dental neglect. This association was a very striking feature throughout the survey.

In the city there were 4.3 per cent more tonsillectomies among the non-goiters than goiters, and 14.6 per cent more tonsillectomies in the

county goiter patients than the city school children. The removal of tonsils opens a large field for discussion as to whether the goiter is a result of preëxisting disease, or has occurred after tonsillectomy as a coincidence.

The chest expansion was measured one inch below the nipple line and a mean of two expansions taken.

The average chest expansion for the group is 2½ inches, slightly less than 1 inch less in goiter cases, in comparison to non-goiters. The chest expansion of county cases was not so great as of city cases, probably because of the difference in the mode of teaching and exercise; nevertheless the chest expansion of goiter cases was about 1 inch less than the non-goiter cases.

The use and non-use of iodized salt was recorded, for it has been advocated by some as a prophylactic.

TABLE IX

IODIZED SALT

	City				County				Combined Total			
	Non-Goiter		Goiter		Non-Goiter		Goiter		Non-Goiter		Goiter	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
Yes	2,289	61.5	391	64.4	281	41.3	31	44.3	2,570	58.3	422	62.3
No	1,076	28.8	183	30.2	349	51.2	36	51.4	1,425	32.3	219	32.3
?	360	9.7	33	5.4	51	7.5	3	4.3	411	9.4	36	5.4
Total	3,725	100.0	607	100.0	681	100.0	70	100.0	4,406	100.0	677	100.0

In the city 3 per cent more goiter than non-goiter cases were using iodized salt, and still there were 13.31 per cent goiters present. This is a greater incidence than was reported in a partial survey by Dr. L. K. Baldauf in 1925, in which approximately 7 per cent of goiter incidence was found.

There was 20 per cent less iodized salt used in the county than in the city, with 5.4 per cent fewer goiters in the county. This difference is not explained alone by the better hygienic life of the country child.

It seems from Table IX that iodized salt used as a prophylactic for adolescent goiters is only a mean of increasing sales of grocers' commodities to the credulous public when in reality it has not been proved to be of sufficient value to be called a prophylactic agent.

SUMMARY

A survey of 5,083 girls of Louisville city high schools and 8th grades, and boys and girls of 9 county schools, with 677 or 13.31 per cent adolescent goiter cases, found a predominance of adenoma and typical adolescent goiters in the county, with 10 per cent higher family incidence of goiter where, in spite of open, hygienic life, goiters develop when the family incidence is high.

These adolescent goiters came from local stock, and not from families of goitrous districts.

The family history is 14 per cent higher among goiters than non-goiters, and 20 per cent higher among the mothers of goitrous patients than non-goitrous, the condition appearing in mothers in 60 per cent and in sisters in 20 per cent of the cases.

The age predominance in Kentucky for adolescent goiter is somewhat higher than the beginning of adolescence, being on an average 14.6 years, and the county school children 1 year earlier.

Teeth without decay were more frequently found among non-goitrous children in both county and city. The county cases had slightly better dental hygiene than the city cases.

The extreme grades of dental neglect were more often found among those having the larger goiters.

Large cryptic tonsils were more often found among the goiter cases, and a greater number of non-goitrous children had had tonsillectomies than goiter cases.

Chest expansion of those with goiter averaged 1 inch less than those without.

Use of iodized salt was greater in the city, where goiter was 5.4 per cent higher than in the county where 20 per cent less iodized salt was used. Iodized salt does not seem to be efficient as a prophylactic.

COMMENT

From the above material it appears that goiters occurred more commonly among the undernourished children who had, to a greater extent, slight or markedly decayed teeth, as well as hypertrophied and cryptic tonsils, and with a chest expansion less than those with no goiter. These children were using 3 per cent more iodized salt to prevent goiter, but showed a greater incidence of goiter than the non-salt-users.

From the foregoing it appears that for the prevention of adolescent goiter more is necessary than the indiscriminate use of iodized salt.

We need a better public understanding of the problem, together with the institution of health habits, education, and individualized supervision of these adolescent goiter patients, not only for their better health but for the better health of future generations.

Contact Carriers in Meningitis*

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IT is generally conceded that cerebrospinal fever (epidemic or meningococcic meningitis) is spread largely by healthy carriers. The control of the disease therefore depends upon the control of carriers. Measures leading to this end have been instituted under military conditions at various times in this country, in England, and in France. No attempt seems to have been made to control the movements of meningococcic carriers in a civilian population over any considerable period of time.

The number of cases of epidemic meningitis reported to the Department of Health in Detroit during the autumn of 1928 was unusually large.† In January, 1929, 66 cases (with 35 deaths) were reported as compared to an average of 3 for January of the 5 previous years. It appeared certain that an epidemic was in progress. Accordingly, the Commissioner of Health issued an order effective February 1, 1929, requiring the isolation of home contacts for a period of 14 days only, or until two consecutive nasopharyngeal cultures, taken not less than 24 hours apart, were found to be free from meningococci. Persons actually living in the apartment or house at the time the case was diagnosed as epidemic meningitis were considered contacts. In a few instances intimate or casual friends, who had been with the individual just before the illness began, have voluntarily requested that cultures be taken; but such persons when proved to be carriers were not officially isolated.

This report summarizes the experience in Detroit during the 6 months ending July 31, 1929.

Most of the cultures were taken by Department of Health nurses who were assigned to this work and carefully instructed. Some contacts came to the laboratory, but such a procedure was discouraged, particularly when street cars were used as means of transit. The cultures were taken from the nasopharynx with a swab on the end of a bent aluminum wire. The swab was then inserted in a sterile tube and placed in a towel between two warm water bags. Several calls

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* Read before the Laboratory Section of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 1, 1929.

† A complete report on epidemic meningitis in Detroit in 1928–1929 is in preparation and will be published later.

were made by each nurse before returning to the laboratory, and the warm water bags were refilled at each house. Upon reaching the laboratory the tubes containing the swabs were placed in an incubator and plated as soon as practicable.

The method described is not ideal, as is shown by the fact that about one swab out of seven failed to give growth on the culture medium, whereas when plates are inoculated immediately after taking material from the nasopharynx it is rare not to obtain growth of some organisms. We were unable to account satisfactorily for the difficulty. Addition of a little sterile distilled water to the tube containing the swab failed to correct this, so that drying of material was evidently not the cause. It was also found that frequently no growths were obtained from the cultures from persons who had recently gargled or were in the habit of using snuff or chewing tobacco. However, there were many more "no growths" reported than seemed desirable. Such a report was not regarded as a negative result for meningococci, and another culture was taken.

The medium used for growing the organisms was that generally recommended—meat infusion peptone agar of pH 7.6, containing 1 to 2 per cent of dextrose and 5 per cent of defibrinated sheep's blood. Plates were incubated not less than 18 hours before examination. Suspicious looking colonies were examined by means of smears stained by Gram's method, and when Gram negative organisms resembling meningococci were found an agglutination test was made. This was done by fishing suspicious looking colonies and suspending the organisms in 0.5 c.c. of salt solution (0.8% NaCl). Amounts of 0.05 c.c., 0.025 c.c. and 0.01 c.c. of a 1:4 dilution of diagnostic antimeningococcic polyvalent serum were placed respectively in three tubes, and to each was added 0.1 c.c. of the suspension of organisms. A control tube was also prepared.

The tubes were shaken for 2 minutes, incubated at 37° C. for 1 hour, and immediately read. The amounts of serum used for the tests were respectively 0.0125, 0.00625 and 0.0025 c.c. Positive results were reported only when agglutination was obtained in the tube containing the smallest amount of serum (0.0025 c.c.) and the control negative.

The possibility of agglutination by normal horse serum was considered. A series of tests showed that some horse serums agglutinated meningococci in amounts of 0.01 c.c., but not in 0.0025 c.c. Three of the serums tested failed to agglutinate in a 1:10 dilution. Pooled serums behaved as might have been expected from the results with single serums.

We believe our technic has been similar to that used by others. Our aim was to obtain accurate results in as short a time as possible. It was necessary to release contacts negative for meningococci as soon as practicable. Twenty-four hours from taking the culture was as short a time as could be allowed for suitable reports.

From February 6 to July 31, 1929, 2,892 contacts with 619 cases were investigated, or an average of 4.67 contacts per case. For purposes of discussion the time is divided into 3 periods: February 6–March 31, April 1–June 1, and June 2–July 31. During the first period cultures were taken from 709 home contacts with 131 cases; 332 persons, or 46.8 per cent, gave one or more cultures positive for meningococci. During the second period cultures were taken from 1,406 home contacts with 310 cases; 207 persons, or 14.7 per cent, gave one or more cultures positive for meningococci. During the third period cultures were taken from 777 contacts with 178 cases, and 23, or 2.96 per cent, were found positive for meningococci one or more times. The percentage of positive contacts by weeks varied from 0.0 during the weeks ending June 23 and July 31, to 65.6 per cent for the week ending February 17.

The high percentage of carriers found during February, March and the first half of April is in striking contrast to many reports found in the literature dealing with military outbreaks of cerebrospinal fever; but is in agreement with figures given by Ostermann and by Bruns & Hohn, as quoted by Frost,[1] for examination of home contacts. It should be emphasized that we were taking cultures only from persons who had been in rather intimate contact with patients.

Unfortunately, we were unable to obtain cultures from any large number of persons who gave no history of contact with meningitis cases. However, during April, 117 non-contacts were studied and 5, or 4.3 per cent, were positive for meningococci. Of 619 contacts during this same month 146, or 23.6 per cent, gave positive cultures. In July, no carriers were found among 169 non-contacts, while 8 carriers were located among 335 known contacts. Only one culture was made from each non-contact. As will be pointed out below this probably involves some error.

It is obvious that, as warm weather approached, the number of contact carriers diminished. The percentage of positives dropped markedly about 4 weeks before the peak of the epidemic, as indicated by the weekly reports of cases, was reached.

It was necessary to obtain more than one culture from a contact in order not to miss a considerable number of carriers. Of the 332 carriers detected during the period February 6–March 31, 236 gave

cultures positive for meningococci at the first examination; 89 were positive at the second examination after being negative at the first; 6 were positive after two negative cultures; and 1 gave meningococci after three unsuccessful attempts. With only one examination we would have missed nearly 30 per cent of our carriers.

By grouping the carriers according to age and sex, an effort has been made to determine the effect of these factors on the carrier state. Only the figures for the first two periods (February 6–March 31, and April 1–June 1) were used, since the number of carriers in the third period was too small for statistical purposes. Among 2,115 contacts, 1,091 were male and 1,024 female. Of the males 25.6 per cent were carriers (i.e., gave one or more positive cultures), and of females 25.4 per cent. Age appeared to have no influence on the carrier state. For example, 12.4 per cent of contacts were in the 5–9 age group, while 14.8 per cent of carriers were in this group. Fifty-eight and nine tenths per cent of the contacts were 20 years old and above, while 56.8 per cent of the carriers fell in this age group. The percentage of carriers to total contacts in each age group was slightly higher for the 1–4 and 5–9 ages, but the differences were too small to be of real significance.

Crowding is supposed to be a factor in meningitis. Presumably, in a civil population we would expect to find a higher percentage of carriers in crowded rooming houses than in residential districts containing 5 or less persons to a home. The 131 cases investigated between February 6 and March 31 were grouped on the basis of number of contacts per case. In the group with 4 or less contacts per case there were 51 cases and 157 contacts, of whom 64, or 40.7 per cent, were carriers. In the group with 5 to 9 contacts per case there were 71 cases and 446 contacts, of which 211, or 47.2 per cent, were positive. The final group, with 10 or more contacts per case, was composed of 9 cases and 106 contacts, of which 57, or 53.7 per cent, were carriers. These figures indicate a somewhat greater tendency for carriers to be found in the more crowded houses. However, the figures for the second period (April 1–June 1) show just the reverse, being 15.2, 15.2, and 11.9 per cent for the three groups respectively.

The persistence of carriers is a point of some importance. We were able to follow most of our carriers for 2 weeks but no longer, since that time was fixed in our isolation regulations. Again using the three divisions of the 6 months' study—in the first period 32.8 per cent of carriers had not given two consecutive negatives before release, in the second period 25.6 per cent, and in the third period 30.4 per cent had not satisfactorily cleared up. While the advent of warm weather

was coincident with a great decrease in the number of carriers, proportionately the tendency to persist was about the same.

It is necessary to stress the uncertainty of obtaining accurate results in the detection of meningococcic carriers. We have had many experiences which convince us that conclusions from our laboratory data must be drawn with care. Either the carrier state is an intermittent one or our technic is not sufficiently exact—possibly both. Sometimes inconsistent results can be explained, but at other times not. One of our contacts gave the following results for meningococci, —, +, —, —, and accordingly was released. One week later she was sent to the laboratory by her physician because he found that she had been using a gargle during the time the last two negatives* were obtained. The next four examinations gave +, +, —, —. One month later she was still negative. This is by no means an isolated instance.

SUMMARY

This paper gives the results obtained by taking cultures of 2,892 home contacts with 619 cases of epidemic meningitis over a period of 6 months.

The percentage of carriers to contacts varied weekly, from 0 to 65.6 per cent. The highest percentages were found during the winter and early spring months, and the lowest during June and July.

More than one nasopharyngeal culture is needed to detect a considerable number of carriers.

Sex and age play no part in the tendency to become a carrier.

The number of persons in a house has no relation to the percentage of carriers found.

Carriers persist for 2 weeks as frequently in warm as in cold weather, although the actual number of carriers is greatly diminished.

As a result of measures instituted for the control of home contacts with cases of epidemic meningitis, 70 per cent of meningococcic carriers have been isolated until the carrier condition has terminated.

* Negative for meningococci. Other organisms are always present.

NOTE: Assistance has been given in the laboratory work by Catherine O. Wiltsie, Norma H. Broom and Irene Baisley.

REFERENCE

1. Frost. *Pub. Health Rep., Reprint 69*, 1918.

Sudden Heart Failure as a Public Health Menace

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THE public health aspect of heart disease has been presented with considerable statistical data by many writers during the past decade. Increasing annual morbidity and mortality rates from diseases of the cardiovascular system have been especially demonstrated from such able workers as Cohn,[1] Emerson,[2] Halsey,[3] and Pedley.[4] There can be no doubt that the lay public, as well as the physician, is becoming more and more conscious of the fearful toll exacted by the rheumatic and degenerative diseases of the circulatory system; widespread publicity and organized propaganda for enlightenment have made these facts known to all.

Little, if any, emphasis, however, has been placed upon that phase of the cardiovascular diseases which renders an individual suffering from such a condition a possible menace to the health and happiness of others.

The public health problems concerned with leprosy, smallpox, and typhoid carriers have indicated the health hazards to the community presented by those so afflicted; no less important are the problems concerned with sudden heart failure. Temporary or fleeting attacks of muscular weakness, loss of coördination, or actual unconsciousness, may prove to be a menace not only to the individual himself, but also to all those in his immediate environment. This is especially true when such an individual—in control of powerful mechanical and other appliances which require the entire attention and ability of the operator, drivers of vehicles like automobiles and railroad trains, street car motormen, elevator operators and others in occupations where the lives of many are dependent upon perfect mental and physical functioning—may, as a result of temporary and sudden loss of ability to control their activities, place the lives of others in jeopardy.

Three such cases occurring within the period of a single week recently have served to focus attention upon possible measures to pre-

vent the recurrence of similar tragedies. These cases are presented in some detail in order to demonstrate how varied may be the cardiovascular pathology responsible for the condition.

CASE 1

The first case is that of a man, 54 years old, the driver of an 8-ton automobile truck for 9 years. He was apparently in splendid physical condition, a great strapping fellow, weighing about 230 pounds and 6 feet tall. It was not difficult for him to throw a 150-pound barrel on the truck without assistance.

One day while driving through one of the crowded east side streets, he apparently lost control of the machine, which plunged onto a sidewalk, tearing down a store front. Fortunately only a few bystanders were injured by flying glass. A few minutes after the accident, the driver clambered down from the truck and could offer no explanation of what had happened. He had no difficulty in driving away, and continued with his work the rest of the day.

A few weeks later, and again a month later, similar accidents happened. In the first, the truck tore down a support in a garage, several workmen barely escaping with their lives when the roof crashed. In the other, the truck crashed into several vehicles on the street and many persons were more or less severely injured. In this latter accident, the driver was picked up unconscious and removed to a nearby physician's office.

The doctor noted there were insufficient evidences of trauma to account for the unconsciousness; no signs of fractured skull were found. The pulse was scarcely palpable while the heart sounds were very rapid and weak; the doctor concluded that these findings were associated with shock. In about an hour the patient suddenly resumed consciousness, stood up and insisted on going home. The doctor now noted that his pulse was slow but that the heart sounds were of poor quality, and kindly referred the case to me for cardiovascular study.

The following important findings were made: X-ray examination showed that the heart and aorta were both considerably enlarged; the blood pressure was high, two readings giving systolic 220 and 210 mm. and diastolic 120 and 100 mm. Electrocardiographic examination showed evidences of coronary artery sclerosis with a beginning right bundle branch block. Vital capacity and other tests showed a considerable loss of myocardial reserve. Two days later, while waiting in an examining room the patient complained of feeling weak, and collapsed. Examination at that time revealed a rapid and thready pulse averaging from 130 to 160 per minute. Blood pressure was found to be, systolic 80, diastolic 60 mm. Electrocardiographic studies showed a tachycardia of ill defined origin. The graphic records show the condition so clearly that they are presented to demonstrate his normal rhythm and that occurring during an attack (Figure I). The patient made a quick recovery a few minutes after these tracings were taken and again his blood pressure and pulse rate returned to normal condition. A diagnosis of paroxysmal tachycardia of coronary artery disease origin was made.

The position of a cardiologist in cases such as this is, indeed, perplexing. Inasmuch as the patient has a vascular degenerative disease of the heart which is progressive, and since the attacks are due to sudden circulatory changes, the question of permitting him to resume

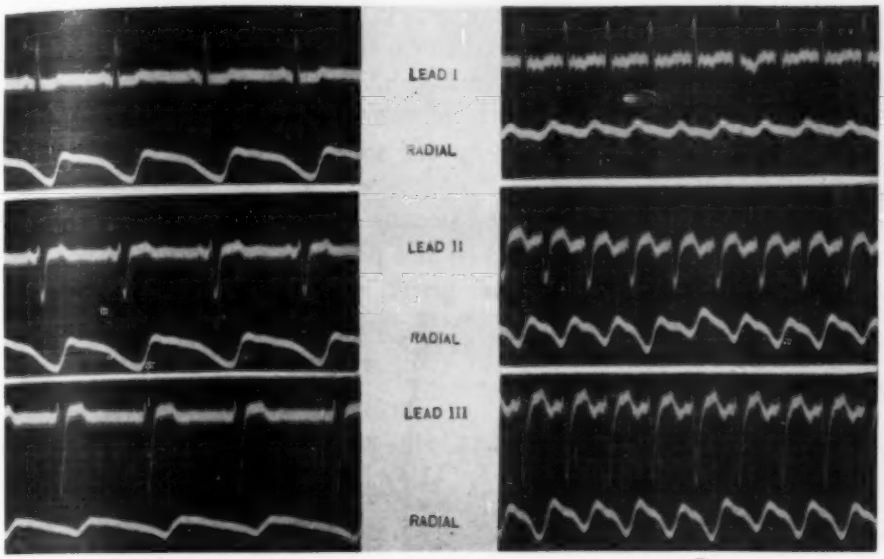


FIGURE I—The upper record in this and in the following figures is the electrocardiographic tracing; the lower is the polygraphic tracing of the radial pulse. Both are photographed simultaneously in order to demonstrate the relation between the electrodynamic phase of the cardiac cycle and the actual mechanical contraction of the left ventricle. The heavy white perpendicular lines represent 0.20 seconds. "A" was taken during the patient's normal rhythm; the ventricular rate is about 60 beats per minute. "B" was taken during an attack; note that the ventricular rate is now varying from 140 to 150 beats per minute. Both records show evidence of coronary artery disease with a marked left axial deviation of the heart.

his occupation as a truck driver is one involving a fine sense of professional judgment and duty. From a public health standpoint in its widest definition there is no question that the patient is a menace to the community as a driver of a great truck upon crowded city streets; the hazard to lives and property should he have another attack while crossing a busy thoroughfare is evident. On the other hand, truck driving is this man's sole occupation and his only mode of livelihood. If the attacks do not recur, he is a capable and efficient member of industrial society; he fills a useful place in the community. It is obvious that if the employer should learn the true nature of the matter he would be unwilling to have the man continue in this capacity, for the liability might be too great.

The rôle of the physician under these conditions is not well defined. Vascular degenerative diseases of the heart are not reportable to the health departments of the city or state, as typhoid carriers and cases of leprosy are; yet as hazards to the public health they are no less important. At the same time, the personal responsibility to the patient and his family demands that he be induced *voluntarily* to give up his

employment as a truck driver, not only for his own welfare but for that of others. In the face of refusal to do this the physician is presented with a double-edged problem: duty and faith to the employer and to his patient. I do not pretend to offer a solution. The patient (case No. 1) after a long discussion agreed to take up some other type of work.

The second case is presented because it is not uncommon and because the public health aspects of the problem are rarely considered, yet the possibilities for harm are great.

CASE 2

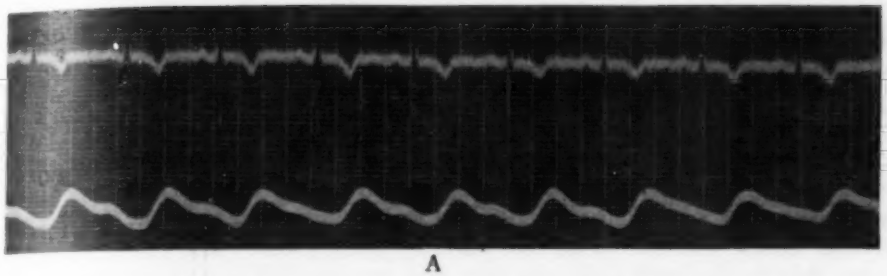
A young woman, aged 28, had been employed as an elevator operator for more than 4 years in a large office building in New York City. Her record had been excellent, but one day, while descending, the car suddenly dropped several floors and many passengers were shaken up. Investigation showed no mechanical defects of the elevator. Subsequently, other accidents occurred to the various cars which this young woman was operating. Inspectors, who were watching her, reported that she was extremely careful but was apparently becoming very "nervous" because of the accidents.

One morning she was found unconscious in a car which was located between the 14th and 15th floors. With some difficulty, officials managed to remove her from the car to an adjacent office and a physician was summoned. He noted that she was pulseless; the heart sounds were very loud but very irregular; the rate was very rapid.

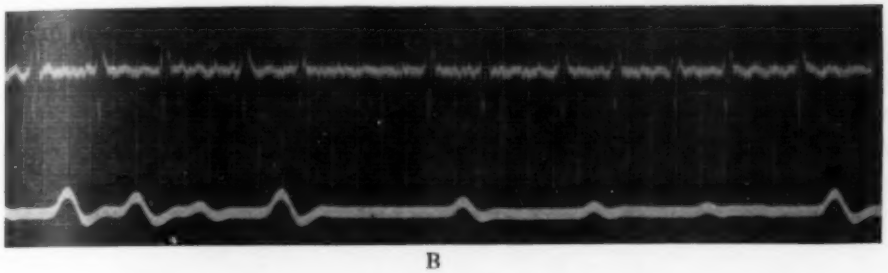
Called to see the case in consultation, I made a diagnosis of paroxysmal auricular fibrillation of mitral stenotic origin. Subsequently it was learned that the patient had a long history of rheumatic heart disease and had suffered from mitral stenosis for many years. Cardiovascular examination revealed a rather typical mitral rheumatic heart with low function tests. The graphic records are especially interesting in showing the difference in the circulation during an attack of fibrillation and during normal sinus rhythm (Figure II).

It can be readily noted that the ventricular rate during the attack of fibrillation is so rapid that the left ventricle is incompletely filled, and sometimes there is a contraction when it is entirely empty; this results in only partial or no opening of the aortic valves. From a hemodynamic point of view there develops a very poor peripheral circulation which clinically is manifest, with attacks of syncope or unconsciousness. Under such conditions the brain usually suffers most, and moments of *petit mal* are common; during this period coördination is lost but may be regained a second or two later. Several such attacks were carefully studied; one is recorded in Figure IIB. Note the radial pulse absent for 4.4 seconds.

The cardiologist's standpoint in this case is clear-cut; the results of the cardiovascular study indicate that the patient is suffering from a severe form of heart disease which may render her at any time unfit for the occupation in which she is engaged. The danger to passengers in the elevator, should she suddenly become unconscious, is too obvious to permit of discussion. A periodic health examination, or an ex-



A



B

FIGURE II—"A" shows a normal auriculo-ventricular rhythm with a radial rate of about 72 beats per minute.

"B" shows what happens when fibrillation of the auricles occurs; the ventricular rate now is grossly irregular, varying from 110 to 150 beats per minute. During the rapid phase the aortic valves do not open and from R_1 to R_2 there is a period of over 4 seconds before an effective beat comes through. The peripheral circulation and especially that of the brain may respond with the usual symptoms of acute anemia.

amination at the time she applied for work, should, of course, have been made. Most of the hazards formerly encountered in elevators have been gradually eliminated with the installation of automatic safety devices; the one great hazard still unprovided for is the *individual* operating the car! Too often, jeopardy to life and limb is caused by physically incompetent persons. In this regard it is interesting, though somewhat distressing, to note that only recently in compiling a list of suitable occupations for the "cardiac cripple," a certain welfare organization recommends "the running of passenger elevators as a job not involving too great stress for those thus handicapped. . . ."

How often the lives and welfare of innocent bystanders may be jeopardized is aptly illustrated by case 3, which was referred to me for cardiovascular study.

CASE 3

A man 61 years old, a stationary engineer, was employed by a structural steel corporation to run a powerful hoist used to raise steel beams and girders to the upper floors of a skyscraper in the process of construction. The control of the mechanism required long experience and instantaneous ability to activate the proper levers in response to signal bells, rung by a "guider" or look-out man high up in the structure of the building.

One day, after a series of minor accidents, which were the result, apparently, of some slip in the coöperation between the guider and the engineer, a steel arch, weighing many tons, through some mistake in signals had slipped and crashed through the sidewalk from a considerable height. When the ambulances had completed emergency work, attention was directed for the first time to the engineer. He was found semi-conscious bending over the gears of his machine; a clammy sweat and a peculiar pallor caused the ambulance surgeon to insist that he go to the hospital. After a brief stay, he returned to his home; the following day he had another attack which rendered him partially unconscious. The family physician noted that the patient's pulse was very slow, at times 20 to 30 beats per minute, with poor heart sounds.

A few days later after another attack, I made a presumptive diagnosis of complete heart block or auriculo-ventricular dissociation. Cardiovascular studies revealed a rather unusual phenomenon which is very beautifully visualized by the accompanying electrocardiographic and polygraphic tracings (Figure III). The

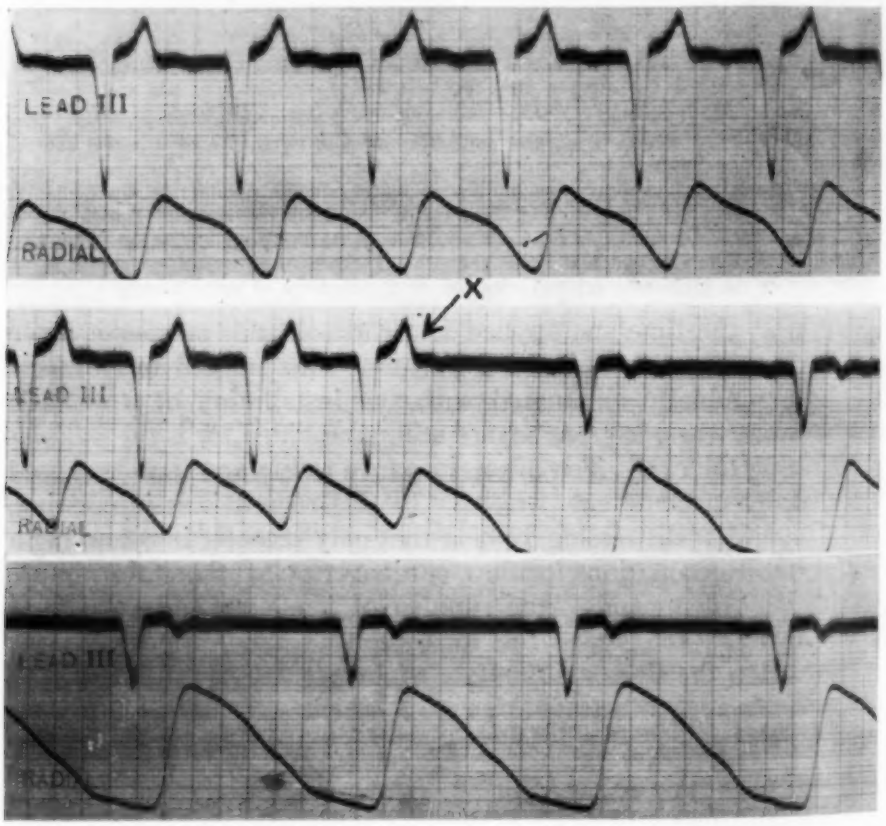


FIGURE III—The three records are continuous from above downward. The first shows a normal sinus rhythm; there is present in other leads evidence of serious myocardial damage. The radial rate averages 74 beats per minute. The second record shows the sudden transition from sinus rhythm to complete dissociation of auricular and ventricular rhythms; the radial rate drops to 34 beats per minute.

patient had an attack during the examination. It will be noted that the normal sinus rhythm at the point marked "X" suddenly stops and there develops a slow, less regular rate of about 38 beats per minute, with independent auricular and ventricular rhythms. The condition from a cardiologic point of view approaches the Stokes-Adams syndrome, but in this case the symptomatic response to the sudden change of rhythm is out of proportion to the actual change in the peripheral circulation.

The sudden change in the rhythm is responsible for the period of unconsciousness or loss of coördination ability. Under ordinary conditions of life such attacks of weakness may not be of great significance, but in a position involving tremendous physical and mental responsibilities they may assume tremendous importance.

In presenting these three cases, the public health aspect has been emphasized, as attention is usually focused upon the individual himself. Treatment and prognosis have no place here, but the problem of preventing such accidents may well invite our consideration.

Accident prevention in so far as it is dependent upon the integrity of the human mechanism must receive its greatest support from the facts and information discovered by personal examination of the individual; this is especially true where an individual is engaged in an occupation where great hazard to others may be the result. In this group may be placed the condition known, for want of a better name, as "sudden heart failure." But the name "sudden heart failure" is in itself paradoxical; the condition nearly always occurs in persons *who have had heart disease for some time*. It is *sudden* only because there is an acute change or re-arrangement of the circulation. If this be true, then the attack might be anticipated, and had public health measures kept pace with the knowledge of cardiovascular diseases, such accidents might be entirely avoidable!

The solution of the problem, as I see it, is not difficult; it means periodic health examination propaganda carried to legislative bodies. Individuals employed or seeking employment in the occupations discussed above would be required to submit to an examination to prove their physical ability to cope with the demands of their work without danger to themselves or others. Sufferers from heart disease should not be required to undergo the stress and effort attendant upon occupations which might prove to be hazardous. They and the community as well should have the same protection as that afforded where there is disturbance of vision. The State of New York, for example, demands that all applicants for automobile drivers' licenses shall be able to see certain standards without glasses. What avails it, therefore, to prevent the blind from driving when a man with serious heart disease may fall dead at the wheel of a large automobile truck? The danger to the bystander appears to be equally great in either case.

Great public health benefit will accrue from the enforcement of examinations of those employed in the hazardous and semi-hazardous occupations. Heart disease, when it is diagnosed, must be considered one of the great causes of preventable accidents, and to those interested in the problem an opportunity for splendid and far reaching public health service is offered.

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New Legislation to Protect Mothers in Italy

AN Italian decree law of May 13, 1929, prohibits the employment of women during the last 4 weeks of pregnancy and the first 4 weeks after childbirth. The woman's position must be reserved for her during this time and also during an additional period not to exceed 3 months if she is unable to return to work at the end of the shorter period. A confinement benefit of 150 lire (a little less than $8 at the current rate of exchange) is to be paid to the women and also a weekly sum equal to the unemployment benefit is to be paid to those who are subject to unemployment insurance, as the majority of manual and clerical workers are. Two special rest periods of 1 hour each must be given daily to nursing mothers until their children are 1 year old.

The law includes manual and clerical workers in all industrial and commercial establishments, and may be extended by royal decree to women employed in heavy agricultural work. Fines are provided for violations of the law (*Gazzetta Ufficiale*, Rome, June 6, 1929, p. 2538).

This decree is intended to supplement previously enacted measures for the protection of employed mothers. For instance, the labor law of 1907 prohibited the employment of women in industry for 4 weeks after childbirth; the present decree adds to this period 4 weeks before childbirth, and extends the provision to all manual and clerical workers.

The maternity insurance law, as amended in 1923, provided a maternity benefit of 100 lire; this amount is raised to 150 lire by the new decree, and is to be paid not only to industrial workers but also to workers in commercial establishments. Finally, there is provided for the first time a weekly cash benefit to be paid to women absent from work on account of childbirth.

Endemic Goiter and Its Relation to Iodine Content of Food*

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GOITER has been described since ancient times; its treatment by food supplies containing iodine was practiced in China thousands of years ago; and it is said that burnt sponges which contained iodine were used by the Phoenicians for the same purpose.

I think it is well to establish in our minds just what we mean by goiter. In looking over the surveys which have been made in various countries, we find that a simple palpable enlargement of the thyroid gland exists in perfect health, especially in females where the enlargement of the gland is not uncommon at the catamenial periods and also during pregnancy. When the thyroid gland enlarges to the extent that it is visible, conspicuous, unsightly and may produce pressure upon the windpipe and other important structures of the neck, it may be termed goiter.

Goiter is one of the best examples we have of an endemic disease. It occurs all over the world but is much more prevalent in certain localities, such as large valleys, mountainous regions, and elevated plains, where also the condition known as cretinism is found. Many theories have been advanced as to its cause, but the accepted idea at present is that it is due to a deficiency of iodine in the food or water supply of the particular locality in which goiter is endemic. We are speaking entirely of simple, not exophthalmic goiter, Graves' disease, or Von Basedow's disease. Here we have a pathological condition with extremely dangerous symptoms.

Baumann, in 1895, discovered that the human thyroid contained an organic compound of iodine. Kendall, in 1914, isolated from the thyroid gland of a sheep a substance which he called thyroxin, which contained 65 per cent of iodine. This was synthetically produced in the laboratory by Harrington. The function of the thyroid gland is to produce this thyroxin. When it fails to produce it in sufficient

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quantities we have the condition known as hypothyroidism; the cells of the gland then proliferate and we have enlargement of the thyroid gland, or goiter.

We have a goiter map prepared by Dr. Olesen of the U. S. Public Health Service which shows the distribution of goiter in the United States, from the results of the examination of drafted men in the recent war. As it relates only to men it is very inaccurate. Proper surveys to determine the amount of goiter in the various states of the United States have been made in but few states. Surveys made in Minnesota, Montana, Michigan, and recently South Carolina, and some surveys made in Tennessee, some in Ohio, and possibly in some other states, furnish all the data we have. In looking over the literature of the U. S. Public Health Service in regard to the occurrence of goiter in the United States we find that most of the statements are based upon guesses made by state health officers for their respective states. I wish to urge that a complete survey be made so that we may know how much goiter we have and where it exists. Roughly speaking, the goiter area consists of an area of the United States containing about 30 million people. In this area are the states of Illinois, Wisconsin, Ohio, Iowa, Indiana, Nebraska, Michigan, the two Dakotas and Montana; and on the west coast, Oregon, Washington and California. Surveys of high school girls in Michigan and Minnesota show that as high as 70 per cent show definite thyroid enlargement.

Studies of the water supplies of these areas show a great deficiency in the amount of iodine present, and certain methods have been adopted to furnish it, such as the use of table salt containing iodine. This salt has been widely put upon the market, and there is great difference of opinion as to the results obtained. It was suggested by Dr. Turrentine, of the U. S. Department of Agriculture, that possibly food would contain iodine in natural combination which would be less rapidly eliminated from the body than the inorganic iodine, and would produce better results in the prevention and treatment of goiter. This was reasoned out from the analogy in the treatment of pernicious anemia.

It was found that when people who suffered from pernicious anemia were treated with liver, the iron and copper contained in the liver relieved the condition, whereas iron and copper administered as inorganic salts did not have any such effect. Beard and Myers, at Western Reserve University, treated rats with liver and found that they could relieve the pernicious anemia, whereas they could not relieve it by administering copper, manganese and iron in inorganic salts.

TABLE I

GOITER SURVEY OF SOUTH CAROLINA

County	*No. Examined*	*Normal*	*Enlarged*	*Percentage Goitrous* *
Beaufort	230	224	6	3
Berkeley	315	312	3	1
Charleston	3,168	3,039	129	5
Dorchester	834	828	6	1
Georgetown	408	406	2	1
Horry	729	720	9	1
Total	5,684	5,529	155	3
Darlington	819	807	12	1
Dillon	1,622	1,499	123	8
Marion	392	384	8	2
Orangeburg	1,301	1,269	32	3
Total	4,134	3,949	185	5
Aiken	1,566	1,555	11	1
Fairfield	515	502	13	3
Richland	278	272	6	1
Total	2,359	2,329	30	2
Anderson	573	564	9	2
Cherokee	564	543	21	4
Greenwood	684	667	17	3
Newberry	700	685	15	2
Greenville	1,433	1,425	8	1
Oconee	1,008	994	14	2
Spartanburg	461	455	6	1
Total	2,902	2,874	28	1
Grand Total	17,600	17,140	460	3.8

* Percentages given to nearest whole number.

It was found by Robsheit, Robbins and others that the liver contained 58.5 p.p.m. of iron, 75.9 of arsenic, 145 of copper, 49 of manganese, and 30.3 of calcium; that the kidney contained 108.9 p.p.m. of iron, 142 of arsenic, 101 of copper, 106 of calcium and 154 of manganese. It was also found that dried apricots contain 48.4 p.p.m. of iron, 181.3 of arsenic, 144.5 of copper, 140 of calcium, and 140.1 of manganese. Accidentally in feeding rats with dried apricots they were obtaining practically the same results as from the use of liver.

Reasoning from the above it was thought that perhaps the iodine contained in vegetables would be of great benefit in the treatment of goiter, and the experiments of Beard and Myers with rats seem to confirm this theory.

Upon the basis of the foregoing it was decided to have an analysis made of the vegetables and fruits of South Carolina. A number of

tables are presented showing the large content of iodine in the fruits and vegetables of South Carolina.

Results of a recent survey of South Carolina for goiter are given in Table I.

The amount of iodine in the daily ration necessary in order to maintain iodine balance is unknown. We know of but one careful experiment—that of Dr. von Fellenberg of Switzerland, who was able to maintain iodine equilibrium over a period of 4 weeks in a man on a diet which contained 0.0143 mg. per day (equivalent to 5.22 mg. per year). It is interesting to calculate the weight in ounces of some fresh vegetables from South Carolina which will yield this amount of iodine (see Table II).

TABLE II

IODINE IN SOUTH CAROLINA VEGETABLES

	Leafy Vegetables		
Cabbage	Average of 8 samples	7	ounces
Lettuce	" " 9 "	8	"
Spinach	" " 14 "	7	"
Turnip Tops	" " 5 "	10	"
	Potatoes		
Potatoes	Average of 76 samples	11	ounces
Sweet Potatoes	" " 70 "	16	"
	Roots		
Beets	Average of 4 samples	24	ounces
Carrots	" " 8 "	21	"
Turnips	" " 12 "	23	"
Asparagus	" " 22 "	27	"

On this basis a diet containing 4 oz. of green vegetable, 8 oz. of potatoes and 4 oz. of root vegetable would yield 0.021 mg. of iodine per day, which is about 150 per cent of the value of von Fellenberg. Since this quantity can be, and frequently is, eaten at a single meal, it is felt that these vegetables are adequate for goiter prevention when eaten regularly.

The survey in South Carolina shows that we have a small amount of goiter, and one naturally asks why, if we have so much iodine in food, we have goiter at all. This is easily answered when we consider that the people do not eat South Carolina vegetables. A study of the situation seems to show that vegetables used in the cities of South Carolina come largely from other states. This is especially true of canned vegetables, as there are no large canneries in the state. It is also true that a great many people do not eat vegetables. In a study of pellagra it was found that although foods containing sufficient pellagra preventive were on the tables of many people in South Carolina, they were not eaten by all the family.

TABLE III

IODINE CONTENT OF SOME SOUTH CAROLINA VEGETABLES, COMPARED WITH RESULTS PUBLISHED BY MCCLENDON FOR VEGETABLES PRODUCED IN CALIFORNIA AND OREGON

	South Carolina Analyses by Remington	California Analyses by McClendon	Oregon Analyses by McClendon
	p.p.b.	p.p.b.	p.p.b.
String beans	429	—	29.0
Beets	233	8.0	—
Carrots	135	8.5	2.3
Lettuce	754	—	—
Peas	197 (ripe)	8.4 (green)	—
Potatoes	517	—	—
Spinach	424	26.0	19.5
Soup vegetables	—	—	13.5
Squash (summer)	1,018	—	—
Sweet potatoes	135	—	—
Tomatoes	273	17.5	—
Asparagus	145	12.0	—
Cabbage	504	—	—
Cucumbers	523	—	—
Egg plant	338	—	—

Results are in parts per billion of iodine in the dried vegetables.

We are just beginning to appreciate the part that food plays in the prevention of disease and the conservation of health. When the germ theory was evolved it was thought that the question of disease prevention was settled, but as the years have elapsed we have found that there are many things that have to be added in order to explain correctly the transmission of communicable diseases, and also that there are many diseases which are not caused by germs but by faulty food habits.

The laboratory which we have established in Charleston in connection with the South Carolina Medical College is making analyses of all vegetables and fruits grown in South Carolina, and these are being compared with analyses made in other states. Unfortunately, this work has been carried on only in a very few states and we have very few data for comparison. It is urged that each state health officer inform himself as to the methods used both by Dr. McClendon of the University of Minnesota, and Dr. Roe E. Remington, our chemist in Charleston, and that proper analyses be made of the fruits and vegetables of other states so that we may have a basis of comparison.

One outstanding discovery has been made through our analyses which upsets completely a theory which has been held in regard to where iodine would be found in the largest quantities. It has been held for a long time that the salt spray, or the sea spray, was the source of iodine. Tables V and VIII seem to disprove this theory, as we find the iodine content of our fruits and vegetables higher in the

TABLE IV

IODINE CONTENT OF POTATOES FROM DIFFERENT REGIONS

Sample No.	Source	Locality	Iodine in parts per billion dry basis
212	Idaho	Twin Falls	160
294	"	Moscow	125
306	"	Hansen	45
			Average 110
129	Maine	Monmouth	203
133	"	Brunswick	283
137	"	Orono	188
138	"	Presque Isle	105
			Average 195
195	Michigan	Pontiac	120
161	"	Greenville	110
168	"	Manton	69
297	"	Chatham	75
			Average 94
139	Minnesota	Grand Rapids	67
140	"	"	117
141	"	"	75
143	"	"	26
144	"	"	70
145	"	"	109
146	"	"	125
147	"	"	98
			Average 86
148	North Dakota	Fargo	78
	South Carolina 72 samples		87 to 544
			Average 211

mountainous regions of the state, 250 miles from the coast, than in areas 30 or 40 miles from the coast. Of course, right along the coast there is more iodine in the vegetables. Granite and other rocks which are found in the Appalachian Mountains contain iodine, and

TABLE V

IODINE CONTENT OF POTATOES IN RELATION TO DISTANCE FROM THE SEA

Distance from Sea	Number of Samples	Iodine Content in parts per billion dry basis (Average)
0– 50 miles	19	180
50–100 "	16	213
100–150 "	15	223
150–200 "	15	249
200– "	4	266

TABLE VI

	Per Cent Goitrous
Michigan (75)	
Houghton County	71
Wexford County	56
Midland County	33
Malcolm County	26
Grand Rapids—Kent County	40
Minnesota (76)	
St. Paul	73
Average of thirteen towns	71
Montana (77)	
Fergus County	49
Carbon	39
Cascade	34
Big Horn	25
Hill	13
Ohio-Cincinnati	40
Colorado (78)	40
Utah (79)	54
Kansas (80)—Topeka	50
Connecticut Average	29
Manitoba (81)	43–79

TABLE VII

IODINE IN SOUTH CAROLINA WELLS, SPRINGS, STREAMS, AND CITY WATER

Date 1928	Type of Water	Location	Iodine p.p.b.
2-13	Seneca River	Clemson College	1.86
4-17	Enoree River	Greenville County	5.54
4-17	Saluda River	" "	2.08
5-8	Broad River	Union County	6.53
5-15	Edisto River	Orangeburg	3.15
5-26	Big Pee Dee River	Near Florence	2.53
5-26	Black Creek	" "	2.52
4-17	Georgia's Creek	Near Easley	2.81
4-17	Table Rock	Pickens County	1.94
2-23	Spring	Clemson College	0.39
4-17	Spring—Chick	Greenville County	2.05
5-15	Well (R. N. Brackett)	Clemson College	4.22
5-15	Well (Hotel)	" "	1.25
1-19	Rain Water	" "	1.93
2-22	Drinking Water, raw	" "	2.41
2-23	" pure	" "	1.75
5-15	" raw	" "	2.20
5-15	" pure	" "	1.10
5-22	" raw	Spartanburg City	5.12
5-22	" pure	" "	1.41
5-28	" raw	Columbia City	4.16
5-28	" pure	" "	2.21
6-8	" raw	Charleston City	4.51
6-8	" pure	" "	2.10
6-12	" raw	Greenville City	5.42
6-12	" pure	" "	3.16

TABLE VIII

IODINE CONTENT OF POTATOES IN RELATION TO SOIL AREAS

Soil Area	Number of Samples	Iodine Content in parts per billion dry basis (Average)
Coastal Region	7	198
Lower Pine Belt	16	164
Upper Pine Belt	12	234
Sand Hills	7	191
Piedmont	27	249

the disintegration of these rocks has increased the amount of iodine found in the soils in the upper part of the state.

Iodine is a natural plant food and where it is contained in large quantities in the soil plants grow extremely well. It seems that in the metabolism of the plant iodine is the natural constituent, as it is in the metabolism of man. Iodine is contained in fish, oysters, and other sea life, but these are not staple articles of diet in the state; in fact, they are not used as such even on the coast. McClendon and others have examined a large number of samples of surface water from different parts of the United States, but there is practically no place in the country where drinking water contains enough iodine to provide for the needs of the body. The examination of foods in Maine and Connecticut revealed that there is more iodine in these than in corresponding products in Wisconsin, Minnesota and Oregon, and there is more goiter in Wisconsin, Minnesota and Oregon.

We felt that the work done under the auspices of the South Carolina Food Research Commission—composed of Dr. William Weston, Chairman, the President of the State University, the President of the State Medical College, the President of the State Agricultural College (Clemson), the State Health Officer, and Dr. R. R. Walker—was of such importance and brought out so many new facts in regard to the iodine content of foods, that it should be called to the attention of the Conference of State and Provincial Health Authorities of North America, with a view that they might make an investigation and study of these facts, and provide that such food analyses be made in their own states. We know that South Carolina fruits and vegetables contain sufficient iodine for nutritional purposes, and if people will eat South Carolina fruits and vegetables they may reasonably expect not to have goiter.

Industrial Cleanliness and the Courts

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LAWS requiring adequate washing facilities to be provided for the employees in various industries are now in force in one-half of the United States. Most of this legislation refers only to special conditions, such as those in coal mines, lead works, or foundries, but some of it applies to all factories and mercantile establishments. Where a law is limited in its application, there may be raised against it constitutional questions which can be decided only by the courts in actions brought before them.

The constitutionality of state washroom laws has been adjudicated by courts of last resort on 8 occasions, including decisions by the Supreme Court of the United States and the highest tribunals of 5 states. In only 1 state is such a law now held unconstitutional, and in that case only because the method of securing establishment of a washroom in a plant is held to be at variance with a special provision of the state constitution. In all other instances the legal principle seems well established to the effect that it is a valid exercise of the police power for the state to require owners or operators of certain industries, such as coal mines, to provide washrooms for their employees, and, furthermore, that the statute may require that such washing facilities be furnished on the demand of a specified number of the employees.

The first litigation on this subject arose in Illinois as a consequence of an act of 1903 (Hurd's Rev. St. 1903, c. 93, No. 37) which required owners of a coal mine to provide and maintain a washroom at a convenient place at the top of the mine. A mine owner was convicted in a lower court for violation of the act and appealed to the Supreme Court of Illinois, which handed down its opinion in 1906.[1] It was insisted on behalf of the defendant that the statute was unconstitutional and the court decided in this case that the law placed upon mine owners a burden not borne by other employers of labor and discriminated in favor of mining employees against laborers engaged in other occupations. For these reasons the act was held invalid as special legislation and as an improper exercise of the police power. Later decisions have, however, changed this principle.

A law of broader scope was passed by the Illinois Legislature in

1913 (Hurd's Stat. 1913, c. 48, No. 184). This act required the maintenance of a sanitary washroom at a convenient place by every owner and operator of a coal mine, steel mill, foundry, machine shop, or other business in which employees become covered with grease, smoke, dust, grime, and perspiration to such an extent that to remain in such a condition after leaving work without washing and cleansing their bodies and changing their clothing would endanger their health or make their condition offensive to the public.

In the litigation which immediately arose—incidentally from the same county as before—the Supreme Court held that this law was valid,[3] stating:

> The purpose of the law is to promote the health and welfare of employees in certain lines of business where conditions are such that every facility should be afforded for cleanliness, and to provide for the comfort and welfare of those with whom such employees come in contact after leaving their place of employment.

This law was held good under the police power of the state, especially since the legislature in enacting the later statute undoubtedly had in mind the previous court decision.

This same law was, however, construed in an extraordinary manner by the same court in a decision delivered a few years later.[5] A railway company was convicted of failure to comply with this statute and the court held that a roundhouse where 60 men were employed did not come within the purview of the law. This, of course, was a question of fact and it was ruled that "the evidence did not bring the roundhouse and the machine shop within the terms of the statute." The sanitary conditions which usually prevail at roundhouses would hardly seem to justify the result.

At about the same time that the Illinois statute of 1913 was sustained, an even more drastic law in Indiana was pronounced valid. This particular act required the owner of a mine to provide washing facilities when 20 or more of the employees petitioned for the installation of such facilities. The Supreme Court of Indiana held that this act was constitutional, saying:

> The provision of the law is a salutary one and is no more unreasonable than the provision of the law which requires the mines be guarded, lighted and ventilated. This act has to do with the comfort, health and care of the employees of mines, and is within the legislative discretion.[4]

The mine owners were not satisfied with this decision, and appealed to the Supreme Court of the United States, on the ground that their rights had been infringed under the Constitution of the United States. The highest court of the land denied this contention and sus-

tained the constitutionality of the state law with respect to its operation under the national constitution, holding that the act did not deny equal protection of the laws.[5] In the course of its opinion, this court stated:

> Having the power in the interest of the public health to regulate the conditions upon which coal mining may be conducted, it cannot be limited by moments of time and differences of situation.

In the same year that this decision of the Supreme Court of the United States was written, the Supreme Court of Kansas upheld a law of 1911 of that state, which required owners of coal mines to furnish washrooms.[6] As in the early case in Illinois, it was asserted that the law was discriminatory, in that it did not place a similar burden on the operators of other mines. The court held, nevertheless, that this contention was not correct as a matter of law. It was the province of the legislature to determine the necessity for the law and the subject came properly within the police power of the state. The Kansas court relied in part on the McLean v. Arkansas and Booth v. State decisions cited above. (See footnotes 5 and 4, respectively.)

The one case which has gone contrary to these decisions is a Kentucky one, decided in 1922.[7] Here there was a state law similar to that in Illinois in that it applied to various industries where employees were covered with grease, smoke, dust, grime and perspiration, and it was also similar to that of Indiana in the provision that a washroom must be erected when 30 per cent of the employees so decide and notify the owner.

In an exhaustive opinion the Court of Appeals of Kentucky reaches the conclusion that the law in question is inconsistent with a section of the Kentucky constitution, which prohibits the enactment of a law to take effect upon the approval of any other authority than the General Assembly. Certain subjects are exempt from this provision, but the regulation of coal mines is not among them, nor is there any provision for such regulation in any other section of the state constitution. Although the Indiana constitution has a somewhat similar provision and the washroom act of that state was upheld under it, the Kentucky court did not feel that it could depart from its consistent attitude in holding that the constitution of its own state was more stringent in this regard.

The most recent case on this subject was decided by the Supreme Court of Tennessee on December 8, 1928.[8] In this decision a statute of 1921 requiring that wash-houses be provided at coal mines employing 50 or more persons was sustained as valid and constitutional. The court held that this legislation was a proper exercise of the police

power and that it was entirely proper for the legislature to decide to legislate in this manner after considering all aspects of the problem. The law, applying only to coal mines of a certain size and over, was held not to be class legislation, because—

> Legislation designed to protect the health of coal miners cannot be said to be founded upon an arbitrary classification, because it is not extended to other industries, in which the legislature may have found that working conditions were dissimilar.

While on this subject of cleanliness, one other court decision should be mentioned. That was a case decided in 1919 by the Supreme Court of Appeals of Virginia, which inferentially sustained an act to prohibit the use of roller towels in public lavatories, but held that a lavatory in an office building owned by a private individual is not a public lavatory and that the act does not apply in such instances.[9]

The great weight of legal authority, as shown by this brief review of the pertinent court decisions on cleanliness in industry, is to the effect that a state is acting properly within the scope of its police power in passing legislation requiring industries generally, or certain special industries where conditions warrant, to install adequate washing facilities for the health and comfort of their employees. Such legislation is not, as a general proposition, invalid because it makes the establishment of washing facilities contingent upon a petition from a certain number of the employees, though this requirement has been held in one instance to be inconsistent with a state constitution.

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2. People v. Soloman (1914), 265 Ill. 28, 106 N. E. 458.
3. People v. C. C. C. & St. L. R. Co. (1919), 285 Ill. 523, 123 N. E. 579.
4. Booth v. State (1913), 179 Ind. 405, 100 N. E. 563, Ann. Cas. 1915 D. 987, L. R. A. 1915 B. 420.
5. Booth v. Indiana (1915), 237 U. S. 391, 59 L. Ed. 1011, 35 S. Ct. 617. The same principle is upheld in McLean v. Arkansas (1909), 211 U. S. 539, 29 S. Ct. 206, 53 L. Ed. 315, though in this case the law dealt with the measuring of coal.
6. State v. Reaser (1915), 93 Kan. 628, 145 Pac. 838.
7. Commonwealth v. Beaver Dam Coal Co. (1922), 194 Ky. 34, 237 S. W. 1086.
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Voluntary Agencies' Activities in a City Health Education Program*

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THE general guiding principle as to the part voluntary agencies should play in the health education program is, generally speaking, the same as that which should guide their general program of work in relation to the community's health program. Governmental agencies have the right of way in both cases.

We may safely assume that it is the obligation of the city health department to do two things in addition to whatever other activities it may undertake. One is to bend its efforts constantly to keep the public acquainted with the functions, purpose and needs of the department; and the other is to keep the public informed as to the health conditions existing in the community as revealed by vital statistics available through the city health department. How much the official department may do beyond that depends upon the zeal and interest of the director, his understanding of the importance of educational work, and his facility or that of a staff member in the art of telling his story to the community, particularly regarding the question of the funds available.

How much the private health organizations should undertake to do will therefore be dependent upon the program of the official department. Competition, above all, is to be avoided. For the sake of harmony and progress the private organization should withdraw in favor of the official department whenever there is a conflict.

The great development of volunteer health activities in recent years, in the fields of tuberculosis, nursing, child hygiene, dental health, housing, cancer, heart disease, social hygiene, mental health, and work for the blind and the deaf, has resulted in most communities in a decidedly disjointed method of health education. The emphasis given to one or another problem is great or little depending upon the vigor, power, and funds of the organization interested in that particular field. Some fields may be practically ignored. Publicity efforts often over-

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lap and interfere with each other. One of the first jobs of private health organizations is, therefore, to coördinate their publicity and educational programs. This has been done in but few communities. Nevertheless, it is one of the developments that lie ahead and must be attained before the volunteer agencies will find their proper place in the health education scheme and produce results accordingly.

Dr. Louis I. Dublin tells us, and his judgment is confirmed by others, that life expectancy can be increased another ten years if we can apply all of the public health knowledge already available to us, but that to do the job with the highest degree of efficiency the public health department needs a per capita appropriation of $2.50 annually. No health department in the United States has attained such a goal. It seems reasonable to assume that it will be many years before it can be attained for the majority. Whether we consider Dr. Dublin's goal attainable or not, there will be general agreement that far larger appropriations are needed than are now available. Here alone is a task that may well provide a major objective for health organizations for some years to come. It should be one of their main objectives.

Voluntary agencies must interpret their own work and their own problem to the public. Their effectiveness and their financial support will depend to a considerable degree upon their success in this direction. It has usually been true in the past that new pieces of work have to be launched and carried on for a considerable period by volunteer groups. This is true in some communities more than in others, depending to some extent upon the initiative and ingenuity of the health officer, but more upon the relative difficulty of securing funds for official health departments.

In the field of tuberculosis, while most of the actual services are being, and should be, taken over by official departments, a large portion of the task of educating the public to a knowledge of the cause, prevention and cure of the disease, and the operation of summer camps; stimulating reporting by physicians; working along with city officials for adequate sanatoriums and a high grade of service rendered by them in improving the social service and relief programs for the tuberculous; taking charge of industrial placement and similar activities; will fall to the lot of private organizations. In those communities in which the official department has advanced to the point where it has the funds and the staff to carry most of these functions, every encouragement should be given the official department to do it, leaving to the private organizations, perhaps primarily, the task of supplementing the education program.

Not many health departments are equipped to carry on programs

in cancer control or in the prevention and relief of heart disease. So long as these activities are new and not sufficiently demonstrated to make it easy for the health department to undertake them, or where the department cannot get the needed funds, the work should be initiated and carried on by private organizations. A vital part of the task is, of course, education.

There is considerable question as to whether the job of bedside nursing will for many years be considered a part of the responsibility of the official agency. There is no group in the community with greater opportunity to teach the fundamentals of public health in a quiet, practical and effective way than the visiting nurse, for there is no time when information about health "sinks in" more effectively than during illness in the home. Many visiting nurse associations have realized not fully their great opportunity in this field. It remains one of the developments to be fulfilled in the future.

The growth of medical and health service in industry has not been so rapid as many of us have hoped. The average captain of industry seems to be impressed with the fact that he can best limit himself to the job in hand, and steps over only grudgingly and reluctantly into such a field as health protection for his employees. Health education in industry, with the encouragement of the periodic examination of the workers, remains one of the jobs that we have scarcely started. While industrial hygiene is within the province of the official department that is interested and able to undertake it, yet in all probability it will remain for volunteer organizations to take the lead for some time to come. Education will be an important factor.

The city health department is obligated to direct the attack on venereal disease, though at present privately conducted clinics will have to carry on. Law enforcement measures cannot well be assigned to agencies that have not the authority of law. When it comes to the question of teaching sex hygiene, however, it is the volunteer groups that will have to assume the burden. They need also to supplement the efforts of public officials in teaching the facts about these diseases and securing funds for providing adequate service.

It does not often happen that a public official will build up a vigorous program of housing improvement, although he must enforce such laws as may be enacted. Private citizens can stimulate public interest, formulate modern housing and zoning legislation and help to get it enacted, encourage the construction of good homes, teach tenants, and secure public support for vigorous enforcement of the law. It would be difficult to find a city that is doing a good housing job without the educational power of a private agency.

Public health workers interest themselves but little in the field of mental hygiene. They consider to be outside their province such matters as facilities for the care of the insane, the problem of the feebleminded, and that whole broader field of mental hygiene that has to do with the prevention of the minor mental and nervous disorders which cause such a large degree of unhappiness and inefficiency. For the most part it is a task falling to the lot of private agencies, boards of education, or departments of public welfare. There are few fields in which there are more misconceptions and less real understanding.

If communities are to be provided with the right kind of clinic facilities, fitted to the need, properly integrated, conducted in such a way as to enlist rather than to disparage the interest and sympathy of practicing physicians, it is private groups who are most likely to do it. Not that it is a job that cannot be done by a department of health, but the many other tasks devolving upon such departments naturally relegate problems of this kind to the background and, moreover, many directors of city health departments feel that clinic service falls within the scope of curative medicine and is not a function with which the public department should concern itself. There is a distinct educational job to be done here in interpreting to the public the purposes and needs of clinic service. Just as the visiting nurse has an unparalleled opportunity to get over some of the facts about health when she makes her bedside visit, so too there is a great chance to do such a teaching job in clinics.

Similarly in the field of hospital care, the health officer does not usually consider it his responsibility to see that the facilities meet the community's needs, except for communicable diseases. This he considers, and quite rightly so, falls within the sphere of curative medicine. Nevertheless, hospital care is important, and it is a part of the health program that needs particular attention, study and interpretation to the public. There is a tendency in many sections of the country toward over-expansion of facilities for the care of the acute sick. Private health organizations have a responsibility for analyzing the hospital situation in the community and making the facts known to the public in order that the most urgent need will be given priority.

Physicians, nurses, social workers, and the public should realize that provision for convalescent care has been sadly neglected. The public and the government authorities need to be informed that the primary causes of death are undergoing a decided change and that with the lengthening of life more and more people are afflicted with chronic diseases. Practically every community is woefully lacking in

hospital accommodations for the chronic sick. We need to find a way to provide hospital beds at prices within the means of working people. All this means more education and better understanding of our problem.

This matter of the mounting cost of medical care is a pressing problem that demands the attention of private health organizations. Dr. Olin West of the American Medical Association has called it "the one great outstanding problem before the medical profession today." From all cities we are confronted with facts showing that people in moderate circumstances are being asked to pay for care in time of sickness, prices that are completely beyond their reach. The result is a growing social problem, increasing bitterness on the part of people thus charged, and a serious conflict between the medical practitioners who view with alarm the increase in free clinic service, and public health workers who can see no other way under the present circumstances of providing medical care for those of limited means. The income of the average practicing physician is low, in many cases not sufficient to repay the high cost of his education. There are obviously two sides to the problem, and it is a problem that requires most serious consideration. Private health organizations have an obligation to coöperate with the national committee now engaged in the study of this situation, and, if a practical solution is found, to help to educate the public to the findings and in carrying out the recommendations.

The conflict between physicians and public health and social workers is disturbing. It is certainly in part due to the fact that we have not used the proper methods in interesting physicians in public health work, nor in interpreting our work to them. Public departments and private organizations share the responsibility alike for doing a better job in this respect. There are many ways in which private organizations can do much along this line, and these opportunities must not be neglected.

The extent to which the general public are misinformed on some of the simplest facts about health is a challenge to health agencies, public and private. Obviously, our combined efforts have been far short of success in face of the fact that $200,000,000 worth of patent medicines are sold every year in this country, and that many more millions are spent in fees to fake practitioners who constantly hoodwink the public. It is not the amount of money wasted that concerns us, but the danger to the diseased patients who place their confidence in fakes and then go to the ethical physician when it is too late. No need to worry about duplication or overlapping of effort in

our fight against this colossal ignorance. Let us all attack this job with every force at our disposal. The outstanding objective of health education is a better understanding by the lay public of facts disclosed by scientific medicine, and dissipation of the countless superstitions that now abound.

In a general way, it should be the job of the private health agencies, after having coördinated their own efforts, to study the public health needs of the community as a whole, to endeavor to make an intelligent interpretation of the facts to the public, and to build up a sound program of health work adequate to meet the whole need of the community.

Health education has made distinct progress. People understand the purpose of health departments better; many of the old fallacies and superstitions on health matters have been dissipated; and the laity in general are much better informed upon the rules of health than they were in the past. The job that lies ahead, however, is almost boundless. So long as practically all departments of health are receiving sadly inadequate funds; so long as almost no community in the country has a really complete and satisfactory health program; so long as in one large city there are 59 different types of medical cures and cults; so long as $200,000,000 worth of proprietary medicines are sold annually; so long as we have constantly to fight against anti-vivisectionists and anti-vaccinationists; there is a job big enough to tax all of the resources of both public and private health agencies. The most inexcusable thing that can happen is for these groups in any given community to fail to work out their programs in such a way as to accomplish the best results with the least expenditure and the least friction.

Accidents Kill More than War

MORE people die annually from accidents in Illinois than were killed in action in any battle of the Civil War.

During the World War 36,931 United States soldiers were killed in action. During the last 7 years accidents have resulted in 38,532 deaths in Illinois.

Only heart disease, cancer and nephritis among all the diseases cause greater mortality than do accidents. In some years the mortality from pneumonia is greater than that from accidents but the average is less.

These comparisons suggest the enormity of the accident problem. Since accidents occur because people are out of tune with their environment it appears that there must be more than a modicum of truth in the assertion that man is his own worst enemy.—*Illinois Health Messenger*, 1, 17 (Sept. 1), 1929.

Educational Aspects of Dairy and Milk Inspection*

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THERE are many instances where dairy and milk inspectors are employed without experience or technical knowledge of dairying. Where such men are employed, the committee believes that dairy inspection is largely of police control type, unsympathetic in its policies, and in too many instances inefficient in its accomplishments. Where a minimum educational requirement is established, it is believed that constant progress will be made in the improvement of the quality of milk in establishing public confidence in inspection.

Dairy inspectors must meet dairy farmers of all degrees of educational training; the health officer and his assistants and other members of the medical profession; the courts and members of the legal profession; the representative citizens of the community who are interested in important community problems, of which an adequate, safe milk supply is one of the most important; the leaders in community enterprises; chambers of commerce; public welfare organizations, such as the Red Cross, women's clubs, and the Parent-Teacher Association; city and village officials; business men, and operators of dairy plants. The dairy inspector should be able to meet the individual or the group. He should understand their point of view, and in his work get results without making enemies. This demands, in addition to technical training, both tact and a pleasing personality.

The committee believes that if progress along the lines described is to continue, the man selected as dairy control official should be graduated from an agricultural college or from an accredited veterinary college. The subjects recommended for the curriculum should include dairy chemistry, bacteriology, physics, dairy sanitation, and economics. The inspector should have some knowledge, either by experience or otherwise, of the principles of the manufacture of butter, cheese, ice cream, and other dairy products, the production and handling of market milk, and the operation of dairy machinery.

* Report of Committee of International Association of Dairy and Milk Inspectors, 1928.

Dairy chemistry should include not only a thorough training in the testing of dairy products, but some fundamental knowledge at least of organic chemistry and biochemistry. Bacteriology should include general instruction in the principles of bacteriology and a specialized course in the bacteriology of dairy products and in pathogenic bacteriology.

In addition to a complete course of instruction as described, the candidate should have had at least two years' experience or contact with some branch of the dairy industry.

The committee realizes that there are instances where men are available for dairy control work who have had unusual training and experience, and who are, therefore, well qualified to carry on effective dairy control work, although they have no degree from an agricultural college. To cover such cases, a city or state civil service board may include under "education" a statement to the effect that equivalent training, including a knowledge of dairying, together with some college training, may be accepted in lieu of a college degree.

Although the age at which a man may do the most effective work in dairy inspection cannot be definitely stated it is believed advisable to restrict the age of an applicant to the period 21 to 45. Men older than the maximum given may be efficient as dairy control officials, but it is believed that their work in later years will be more satisfactory if they decide to follow this line of work earlier in life.

Some civil service commissions have required that candidates for examination be residents of the city or territory in which the work is to be done. The committee believes that this requirement should be waived in the case of dairy inspector, since the work calls for special qualifications. Such a restriction often works detrimentally, in that some municipalities would be forced to select from a list of unqualified applicants. It is recommended, therefore, that the residence requirements be waived in order that all well qualified men may be given an opportunity to compete in the civil service examination and to qualify for the position.

The committee is of the opinion that the title "dairy and milk inspector" is open to criticism. It does not properly indicate the dignity or responsibility of this profession, nor is the title descriptive of the knowledge and training necessary for modern control work in order to stimulate the interest of the better trained and higher type of men.

With a view of a possible selection of a more appropriate title by the association, the committee recommends for consideration the following titles: "Dairy Supervisor," "Dairy Control Officer," "Chief Dairy Control Officer," "Chief of the Division of Milk Control," or

"Chief of the Division of Milk and Dairy Sanitation." The titles of assistants should be the same except for substituting the term "Assistant."

THE PRESENT SITUATION

To understand the need for recommendations in the field of educational requirements for dairy and milk inspectors, it is necessary that we inform ourselves concerning the present situation. Accordingly, the number of inspectors, the provisions for civil service, and educational requirements for the several types of political subdivisions (cities, counties, states, etc.) are given in Table I.

It should be recognized that it is always difficult to compile such a report and at the same time have it absolutely free of discrepancies, primarily because of the vagueness of the replies in some of the questionnaires. Some states reported a uniform state-wide system of market milk inspection, but the balance of the information submitted indi-

TABLE I

GENERAL SUMMARY OF REPLIES TO QUESTIONNAIRE SENT OUT TO STATES AND CITIES

1. Number of states replying	42
Number of states not replying	7
(Georgia, Louisiana, Mississippi, North Carolina, North Dakota, Oregon, Texas)	
2. Uniform state-wide system of market milk inspection.	
a. Number reporting Yes	5
b. Number reporting No	37
3. Correlating agencies.	
a. State agricultural or dairy departments reported by	27
b. State department of health reported by	12
c. Others (as state college, etc.) reported by	1
d. Gave no answer	2
4. Civil service requirements (reported by states).	
a. Number of states requiring civil service	9
b. Number of states not requiring civil service	25
c. Number of counties requiring civil service	1
d. Number of counties not requiring civil service	22
5. Educational requirements (reported by states).	
a. Number of states which demand special educational qualifications	7
b. Number of states which do not demand special educational qualifications	26
c. Number of counties which demand special educational qualifications	0
d. Number of counties which do not demand special educational qualifications	25
e. Number of cities which demand special educational qualifications	1
f. Number of cities which do not demand special educational qualifications	22
6. Report from city health departments.	
Number of replies	51
a. Civil service required by	26
Civil service not required by	24
Gave no answer	1
b. Special educational requirements specified by	11
No special educational requirements specified by	38
Gave no answer	2

cated so clearly that they did not have a uniform system that these cases were recorded as "No."

There is apparently a conflict in some of the answers to the questions regarding the educational and civil service requirements. In a few instances it was stated that prospective candidates had to pass civil service examination, but gave a negative answer in their replies to the questions regarding the educational requirements demanded. Civil service implies a certain amount of educational training. The committee had in mind primarily a more special training, such as a college degree in agriculture or veterinary medicine, or, in occasional instances, a training based upon a few years of successful experience.

Government Aid to Housing

SEVERAL investigations made in Europe within comparatively recent years have shown the effect of bad housing on the health of the people. For this reason the governments of several countries have taken measures to aid in the building of workers' houses.

Austria, for instance, permits the government social insurance organizations to loan for the building of workingmen's houses as much as 20 per cent of their capital.

In Germany, the public old age and invalidity insurance funds invested in popular housing nearly 200 million gold marks between the end of 1923 and the end of 1927. One hundred million marks was invested in housing by the National Institute for the Insurance of Clerical Employees between January 1, 1927, and June 30, 1928.

In Italy, the government organizations carrying insurance against industrial accidents, invalidity, and old age are permitted by law to make loans for the building of workers' houses up to one-fourth of their annual receipts; in the last few years these receipts have been, on the average, in excess of 5½ billion lire.

In France, the government is lending money to builders of low-priced dwellings. The budget for 1928 provided for that purpose more than 862 million francs.

In Belgium, the budget for 1928 provided an appropriation of 7,300,000 francs for special premiums to builders of working-class houses.—*Le Assicurazioni Sociali*, Rome, vol. 5, 1929, No. 3.

A New Suspending Medium Used for the Intracutaneous Virulence Test of Bacillus Diphtheriae*

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WORKERS in public health who are associated with diphtheria control realize that microscopic diagnosis does not offer conclusive information regarding the pathogenicity of organisms.

Formerly many bacteriologists thought it necessary to inoculate guinea pigs subcutaneously with pure strains. Later modifications permitted the use of the subcutaneous method with a mixed field culture. An immunized animal served as control. Death of the unprotected animal with characteristic lesions evidenced the presence of virulent organisms. Although satisfactory, 2 guinea pigs were necessary for each culture and a period of 96 hours was required to complete the test.

An intradermal method was developed by Force and Beattie in 1922.[1] Field cultures suspended in physiological salt solution were injected into the skin of a white guinea pig. The test dose was 0.2 ml. One hundred units of antitoxin were given 5 hours later. Virulent cultures produced necrotic areas at the site of inoculation. Control animals inoculated at the same time received 200 or 300 units of antitoxin 5 hours earlier. This permitted several tests to be made upon one guinea pig. Experience in our laboratory demonstrated this to be a practical public health procedure, but the protective dose of antitoxin *could* inhibit necrosis if not used with considerable caution.

In 1927 Falk, Tonney, White and Jensen published Electrical Determination of Virulence on Diphtheria Cultures.[2] Later in the same year, they, with Mills, published Electrophoresis of Diphtheria Bacilli.[3] Their work was of considerable interest since it would make possible virulence determination of the majority of routine cultures, without requiring test animals.

The method consisted of determining variations of mobility due to

*Read before the Health Officers' Section, League of California Municipalities, San Bernardino, Calif., October 11, 1928.

the speed of attraction toward the anode of pure cultures suspended in an electrical field.

Experiments were conducted in this laboratory with the view of applying the results routinely. Eighty-seven pure cultures from cases were tested by both electrophoresis and animal inoculations; 56 were virulent and 31 non-virulent by the intradermal test. In the electrical test, 522 mobilities (which represented the average of 6 reversals of polarity for each pure culture) were measured, grouped according to the number of seconds required for the organisms to move the distance of 1 ocular mm.

TABLE I

By Intradermal Test		Electrophoresis seconds required to move organism 1 mm.
Virulent	Non-virulent	
8	0	2 to 3 seconds
23	6	3 to 4 seconds
21	8	4 to 5 seconds
4	5	5 to 6 seconds
0	12	6 through 15 seconds

It will be observed in Table I that 8 mobilities of from 2 to 3 seconds checked with the virulent animal test, while 12 of 6 seconds and over checked with the non-virulent test. However, in the intermediate zone, 3 to 6 seconds, 48 gave a positive and 19 a negative skin test.

The 67 readings between 3 and 6 seconds could not be interpreted in terms of virulence without the animal tests. Virulent strains tend to fall in the fast readings while non-virulent increase as mobility decreases. This confirms in part the principle of electrophoresis, but since virulent and non-virulent are not sharply divided, there is no differential zone to determine electrophoretically one from the other.

TABLE II

SHOWING FAILURE OF PURE DIPHTHERIA-LIKE ORGANISMS SUSPENDED IN PHYSIOLOGICAL SALT SOLUTION TO REACT INTRACUTANEOUSLY AS VIRULENT

Cavy Number*	1			2					3				4	
Strain Number	119	Wh10	387	250	8	260	113	221	270	260	778	119	45A	45B
Reaction (necrosis) as a field culture	NN	X	X	X	X	PN	X	X	PN	PN	NN	NN	PN	PN
Reaction (necrosis) as a pure culture	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN

PN: Positive Necrosis—NN: Negative Necrosis—X: Not Tested

* All 4 cavies died within 48 hours with lesions typical of toxin poisoning. No antitoxin was given as a protective dose, since occasionally reactions were aborted by its use.

Other factors that lessen the practicability of this postulated principle include the age of the culture, the reaction and temperature of the distilled water, and its varying condition due to dissolved atmospheric gases or substances from the glassware, age of the suspension, and the difficulty of isolating pure cultures. Since there are no characteristic differences between colonies of virulent and non-virulent organisms, and a field culture can include both types, picking a virulent one is purely a matter of chance.

Falk and his associates checked their electrical readings by the subcutaneous animal test. We first attempted to check ours by the skin test.

As some of the strains in Table II were from severe clinical cases of diphtheria, it seemed evident that the intradermal test would not apply to pure cultures. In seeking an explanation of this, our experiments resulted in the development of a suspending medium in which toxic strains in pure culture would produce necrosis.

TABLE III

AGAR-PEPTONE-BROTH SUSPENSION OF PURE DIPHTHERIA-LIKE ORGANISMS INOCULATED WITH AND WITHOUT A PROTECTIVE DOSE OF ANTITOXIN

Strain No.	* Antitoxin used	Saline suspended	Agar-peptone-broth	
1196	No antitoxin given	No effect	Congestion	Cavy died in 24 hours
Dr. F5		No effect	Congestion	
263		No effect	Congestion	
30		No effect	Congestion	
1196	500 units given after test had been on for 4 hours	No effect	Necrosis	Cavy lived
Dr. F5		No effect	Necrosis	
263		No effect	Necrosis	
30		No effect	Necrosis	
1196	500 units given 4 hours before testing	No effect	Normal	Cavy lived
Dr. F5		No effect	Normal	
263		No effect	Normal	
30		No effect	Normal	

* Several tests were made to determine how many units of antitoxin were necessary to save the animal without affecting seriously the local reaction. Five hundred units gave the best results.

TABLE IV

FIELD CULTURES SUSPENDED IN SALINE AND IN AGAR-PEPTONE-BROTH
500 UNITS OF ANTITOXIN ADMINISTERED 4 HOURS AFTER INJECTION
CONTROL ANIMALS NORMAL

Cavy No. 13		
March 9, 1928		
Strain No.	Agar-peptone-broth	Physiological salt solution
252 (mixed)	Pronounced necrosis	Negative
253 (mixed)	Pronounced necrosis	Negative
244 (mixed)	Negative necrosis	Negative
1196 (pure)	Pronounced necrosis	Negative
Cavy No. 14		
March 9, 1928		
242 (mixed)	Pronounced necrosis	Negative
245 (mixed)	Pronounced necrosis	Negative
154 (mixed)	Negative necrosis	Negative
Dr. F5 (pure)	Pronounced necrosis	Negative

As all cavies not protected with antitoxin died with post-mortem evidence of toxin poisoning, it appeared desirable to test *pure* cultures from 2 known positive field cases and 2 unknown. One hundred units of antitoxin were used on one test animal, the second receiving none. The protected pig failed to react with any strain as positive, while the unprotected pig was dead within 48 hours, showing pronounced subcutaneous edema, and adrenals a mahogany red. It was apparent, then, that at least one of these pure strains was toxicogenic but had failed to induce necrosis.

Various substances such as peptone induce local congestion through positive chemotaxis. Incorporation of peptone in the suspending inoculating fluid was tried, the result being slight congestion which did not persist long enough to develop necrosis. Experiments with various formulas designed to hold the inoculum mechanically at the site of injection developed the information which follows.

In *Formula C* peptone is used both as a nutrient for organisms and as a stimulant to induce the necessary local congestion. Agar is

Formula C—Stone-Weigel Virulence Test Suspending Medium (Agar-peptone-broth)

Oven dried agar	0.2%	0.2 gm.
Water to make		100 c.c.
Boil briskly to dissolve agar; then add:		
Peptone (Witte's)	4.0%	4.0 gm.
Sodium chloride (C.P.)	0.5%	0.5 gm.
Beef extract (Difco)	0.3%	0.3 gm.
Dextrose (Difco)	0.2%	0.2 gm.
Boil at this stage in double cooker.		
Adjust to pH 7.0		
Then add n/1 Na(OH)	0.7%	0.7 c.c.

Sterilize at 15 lb. pressure for 30 minutes, after tubing; 1 c.c. per tube. Cork tubes and seal with paraffine. Care must be taken to prevent evaporation of stored medium, since a very slight concentration increases the percentage of agar sufficiently to solidify the fluid. Different lots of shredded agar vary in "setting" property; so each new lot should be tested.

absorbed slowly. This prolongs the period of local congestion. Other ingredients favor active production of toxin within the tissue.

The following experiment substantiates our belief that pure cultures of *B. diphtheriae,* suspended in saline with pyogenic organisms, would produce necrosis intradermally, but not alone, and that *Formula C* combined with pure diphtheria organisms would give as good a reaction as would occur with mixed cultures. These tests were all made upon one guinea pig. A protective dose of antitoxin was administered 4 hours later.

Intradermal Injection of:

Salt solution	Negative skin reaction
Agar-peptone-broth	Negative skin reaction
Staphylococci in saline	Negative skin reaction
Streptococci in saline	Negative skin reaction
B. diphtheriae (No. 1196) in saline	Negative skin reaction
B. diphtheriae (No. 1196) with staphylococci in saline	Necrosis
B. diphtheriae (No. 1196) with streptococci in saline	Necrosis
B. diphtheriae (No. 1196) in agar-peptone-broth	Necrosis

The following experiment is representative of many tests with new strains isolated day by day. These gave conclusive assurance that the agar-peptone-broth method was practical for pure cultures.

Giving a relatively large dose of antitoxin was a safe practice where agar-peptone-broth was used for suspension. *Saline* suspensions of pure or field cultures were inhibited when antitoxin was used. The application of agar-peptone-broth suspension to field cultures was a natural sequel to its successful use with pure cultures. Experiments on 90 field cultures using saline and agar-peptone-broth suspensions provided unmistakable evidence of the superiority of the new medium over salt solution.

Further experiments demonstrated that agar-peptone-broth permitted the use of a relatively larger dosage of antitoxin than was pos-

sible with saline without interfering appreciably with the local reaction (necrosis). See Table V.

Cary[4] and others have pointed out that the virulence of an organism and its active toxicogenicity are not necessarily correlated. Strain Park No. 8 of *B. diphtheriae* is highly toxicogenic but of low virulence. In our system of intradermal testing, any pure strain producing necrosis should produce a soluble toxin in broth; any not producing necrosis should be non-toxicogenic. To confirm the reliability of skin reactions as a test of virulence 37 pure strains were tested as saline suspensions, agar-peptone-broth suspensions and as toxic broth filtrates. The demonstration of toxin in a Berkefeld filtrate was necessary, but the production of a powerful toxin ***in vitro*** was not desirable since test animals might be killed before skin reactions could be read. *B. diphtheriae* grown 6 days in the following medium produced a toxin which caused necrosis intracutaneously in one minim doses. Pigs protected with antitoxin remained normal.

Beef extract broth for toxin production:

2% Witte's peptone
0.3% beef extract (Difco)
Distilled water to make 1 liter
Adjust to pH 7.0 and add 7 ml. per liter of n/1 Na(OH)
Sterilize 15 lbs. for 30 minutes

The 37 pure cultures were grown in this broth, killed by addition of 0.4 c.c. of 5 per cent phenol, and passed through Berkefeld filters.

TABLE V

	Cavy No. 15	Cavy No. 16	Cavy No. 17	Control
Mixed Field Culture No.	Saline suspended—no antitoxin given for protection of test animal	Saline suspended—100 units of antitoxin given 4 hours *after* inoculation	Agar-peptone-broth suspended—500 units of antitoxin given 4 hours *after* inoculation	Agar-peptone-broth suspended—500 units of antitoxin given 4 hours *before* inoculation
422	Animal was dead within *36 hours.* Post-mortem showed subcutaneous edema and congested adrenals. Heart blood sterile.	No reaction	*Necrosis*	Normal at end of 72 hours.
357		No reaction	No reaction	
407		Slight welt	*Pronounced Necrosis*	
447		No reaction	No reaction	
395		Slight welt	*Pronounced Necrosis*	
434		No reaction	No reaction	
433		No reaction	No reaction	

They were tested in saline, agar-peptone-broth, and as toxin filtrates. The saline suspended failed to react in conjunction with 500 units of antitoxin. Twenty-one cultures reacted as positive in agar-peptone-broth and as toxin filtrates; 13 were negative by all three tests; 1 toxin filtrate became contaminated and did not react, though the agar-peptone-broth reaction was positive; 1 toxin filtrate gave a very faint reaction, whereas the culture in agar-peptone-broth was negative; 1 culture produced a slight necrosis whereas its filtrate was negative.

Table VI gives the result of 4 cultures representative of this series.

TABLE VI*

Strain Number	422	407	432	253	Cavy No.
Reaction of field culture suspended in saline	Neg.	Neg.	Neg.	Neg.	18
Reaction of field culture suspended in agar-peptone-broth	Pos.	Pos.	Neg.	Pos.	19
Reaction of *Pure* culture suspended in saline	Neg.	Neg.	Neg.	Neg.	21
Reaction of *Pure* culture suspended in agar-peptone-broth	Pos.	Pos.	Neg.	Pos.	20
Toxin filtrate of pure culture	Pos.	Pos.	Neg.	Pos.	23
Pure culture *Control* in agar-peptone-broth (500 units of antitoxin 4 hours previous to test)	Neg.	Neg.	Neg.	Neg.	22

* Photographic reproductions of guinea pig numbers 20, 21 and 22 are representative of the reactions obtained throughout these tests.

SUMMARY

Virulence tests are reviewed briefly with citations of certain limitations in present accepted procedures.

Electrophoresis as advanced by Falk and his coworkers is compared with actual intradermal tests on guinea pigs. Eighty-seven pure cultures studied demonstrate the impracticability of applying the test to routine public health control practice.

The intradermal test with pure cultures does not produce necrosis when salt solution is used for suspension.

Agar-peptone-broth aids in the production of excellent intracutaneous reactions with pure cultures.

Animal inoculations of agar-peptone-broth with mixed field cultures give reactions superior to those produced with the same field cultures in other suspensions.

Comparative experiments show that necrosis production *in vivo* by the Stone-Weigel method parallels toxin production *in vitro*.

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THE VERNES FLOCCULATION TEST FOR THE DIAGNOSIS OF SYPHILIS

DESPITE the great number of articles that continue to appear on the technical and clinical aspects of the various serological tests for syphilis, there is very little recent reference in English or American literature to the Vernes flocculation or " photometric " test. This lack of comment is undoubtedly due to the mechanically elaborate technic of the test, as well as to the difficulties of interpreting the results. Indeed, it involves not only a modification of the classic precipitation reaction between syphilitic serum and lipoid extractives, but an entire elaborate system of serum diagnosis and serum-controlled therapy.

The conditions under which serum and lipoid antigen are mixed are such as to yield not a sharp contrast between a precipitate or a high degree of turbidity for the reaction with syphilitic serums on the one hand, and a clear or opalescent solution for non-syphilitic serums on the other hand, but slight differences in the turbidity of the serum-antigen mixture, detectable when the mixture is examined with a special optical instrument, the Vernes photometer. Low readings on the turbidity scale are found in general in non-syphilitic cases, and high readings in syphilitic cases. The turbidity readings that fall between these extremes are found to occur in both syphilitic and non-syphilitic cases, the proportion of the former increasing with increase in the turbidity readings. This elaborate system of serum diagnosis is based on the contention that in the absence of syphilis the turbidity reading is a constant value for each individual, but may vary from individual to individual. The presence of a syphilitic infection causes this value to increase, the course of the disease being accompanied by variations in the Vernes reading. A low reading before treatment will, for ex-

ample, be accompanied by a higher reading after a provocative treatment. The value of the reading should, according to Vernes, decrease to the normal constant value for the particular individual, if treatment is correctly administered over a sufficiently long period of time.

The Vernes system thus admits of no absolute positive or negative report for a single test, nor can the readings be readily interpreted in terms of the accepted $+ + + +$ scale of the Wassermann reaction. The burden of interpretation becomes a matter of *probability* for a single reaction, and of *variability* or *constancy* as influenced by antiluetic treatment for repeated tests. Indeed a single moderately low Vernes reading cannot be classed as a negative reaction unless it is known to coincide approximately with the normal Vernes reading of the patient in question, a criterion which it is obviously impossible to apply in many cases.

By thus contriving to express the serum reaction in terms of quantitative variations of a qualitatively continuous property of syphilitic and non-syphilitic serum, Vernes has made a distinct serological contribution. The principle on which his test is based, and the procedures involved, might lend themselves to special theoretical studies on the chemical and colloidal changes in the serum that affect the reaction with lipoid antigen.

From a practical viewpoint, the Vernes test seems to have several distinct limitations. In the first place the test is very complicated in technic and requires a relatively large amount of serum, at least 15 c.c. and preferably 20 c.c. of blood being specified. Furthermore, the very quality of indefiniteness, in which lies its theoretical significance, seems to detract from the practical applicability of the test for diagnostic purposes. Most of the published studies deal in great detail with the syphilometric analysis of a few cases, relatively few summarizing tables being available in which the serological results with this method are compared with the clinical findings in a large number of cases. As an exception may be quoted the recent report of the serological conference held at Copenhagen in June, 1928, under the auspices of the League of Nations Health Committee. The data furnished in this report show that in a group of about 500 serums from syphilitic cases, the Vernes test returned 40 per cent positive, 14 per cent doubtful, and 46 per cent negative reactions. The most satisfactory Wassermann method tested at the conference showed on the same group of serums 42 per cent positive, 15 per cent doubtful, and 43 per cent negative reactions, while the best of the precipitation methods tried gave 61 per cent positive, 7 per cent doubtful, and 32 per cent negative reactions. At the same time in a group of about 400

specimens from non-syphilitic cases, the Vernes test returned 0.5 per cent positive, 10.2 per cent doubtful, and 89.3 per cent negative reactions. The Wassermann test gave no positive, 2.8 per cent doubtful, and 97.2 per cent negative reactions, and the precipitation test above referred to gave no positive, 1 per cent doubtful, and 99 per cent negative reactions. The Vernes test thus seems to be less sensitive than a satisfactory precipitation test, and less specific than either a good Wassermann or a good precipitation test.

THE CHAMBER OF COMMERCE AND HEALTH CONSERVATION

THE Chamber of Commerce of the United States of America at its Seventeenth Annual Meeting adopted a resolution which stated:

> The gratifying progress of recent years in extending the average span of human life gives good reason to expect further advance through concerted efforts, both for health conservation and for prevention of accidents which are constantly growing and cause the premature death annually of thousands of our citizens. In order to conserve life and health to the fullest extent there should be further development of national interest and of national activity. In efforts directed to this purpose the Chamber should participate and should enlist the widest possible coöperation on the part of its membership.

As a means of creating a nation-wide interest in health development the Chamber of Commerce has instituted a Health Conservation Contest among its member organizations and has asked the Committee on Administrative Practice of our Association to act in an advisory capacity. This contest, conducted as it will be by a responsible organization, should tend to arouse community interest and improved understanding, thus meeting fundamental need.

The Executive Board at its meeting on December 8, 1928, voted to approve of the coöperative undertaking by which the Committee on Administrative Practice will serve as technical advisers in the Health Conservation Contest carried out by the Chamber of Commerce.

In his greetings to the health officers called together by the Committee on Administrative Practice with reference to this activity, William Butterworth, President of the Chamber of Commerce, stated:

> The object of the competition as outlined is to assist in reducing economic losses in the United States due to unnecessary illness and premature death by means of activities carried on by local chambers of commerce or similar associations in cooperation with their official health agencies. It is now known that at least 130 chambers of commerce have active committees engaged in health conservation work, and, accordingly, the contest is designed to give recognition and credit to the work of these committees as well as those that will undertake activities of a health nature in the future.

The Committee on Administrative Practice of the American Public Health Association through the studies of public health administration and work on appraisal of city health service is in a position to advise the Chamber of Commerce, with the best interests of the profession and of public health promotion in mind.

The service plan for this technical coöperation is twofold in purpose: (1) supplying technical aid on request of the local health officer; and (2) the appraisal or evaluation of the health work and its collateral activities in a particular city.

The hope is to arouse the interest of the local citizens and crystallize their attention in such a manner that the important men and women as well as organizations will assume a greater interest, give more intelligent knowledge, and develop a sympathetic appreciation of the problems and program of their health officer, so that eventually they will constitute themselves real and vital factors in relation to health questions and their solution.

When committees of chambers of commerce and civic groups in general become interested in the health department, when mortality rates—rates incident to preventable illness, accidents and to physical disability—assume a definite meaning to these organizations and groups, then the economic disadvantages of higher rates will become readily apparent. The per capita appropriation for health work will then be a subject of study and we may look for and anticipate more comprehensive and intelligent budgeting. The business instinct of such a community can be relied upon to assert itself and the essential funds for a well defined health program will be more readily obtainable.

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PUBLIC HEALTH ADMINISTRATION

HENRY F. VAUGHAN, D. P. H.

How Many Scarlet Fever Exposures Contract the Disease?—During the two years 1927 and 1928, there were in Detroit 7,967 cases of scarlet fever, 6,615 of which were primary cases and 1,352 secondary cases. To these 6,615 primary cases there were 10,888 presumably susceptible immediate family contacts, or 1.64 contacts per case. In all, 12.4 per cent of these contacts, or 1,352, contracted scarlet fever. While 12.4 per cent was the average of secondary cases to contacts, there was wide variation in the secondary case rates dependent primarily upon the length of time the contacts were exposed to the disease. Secondary cases ranged from 19 per cent where the contacts remained at home with the patient, to 3.95 per cent among contacts removed to adult friends' homes. In all 2,970, or 44.9 per cent, of the primary cases were hospitalized. Of the contacts to these hospitalized cases 10.7 per cent developed scarlet fever while 14.5 per cent of those exposed to cases cared for at home developed the disease.

Table I gives the disposition of immediate family presumably susceptible contacts and the number of secondary cases developing among them.

From these figures we may conclude that if a member of your family contracts scarlet fever and you are under 16 years of age and have not had the disease, or a negative Dick test, your chances of avoiding the disease are best if you go to stay with some adult friend. You are approximately 5 times as likely to get scarlet fever if you stay at home with the patient. If you are unable to visit an adult friend but will

TABLE I

DETROIT SCARLET FEVER CASES IN 1927 AND 1928

Where Case Was Cared For	Primary Cases	Susceptible Family Contacts *	Secondary Cases	Per Cent of Contacts Contracting the Disease
Cared for in the hospital—Case removed within 3 days of onset	2,130	4,150	224	5.39
Cared for in the hospital—Case removed more than 3 days after onset	840	1,874	266	14.19
Secondary cases occurring after patient returned from hospital		5,534	155	2.80
Total cases cared for in the hospital	2,970	6,024	645	10.70
Case cared for at home. Contacts removed to adult friends' home	776	1,465	58	3.95
Cared for at home—Contacts at home with the patient	2,869	3,399	649	19.09
Total cases cared for at home	3,645	4,864	707	14.53
Grand Totals	6,615	10,888	1,352	12.41

* Members of the immediate household who are under 16 years of age and who have not had scarlet fever. Our assumption that they are susceptible is, of course, in that they have not been Dick tested.

have the sick person sent to the hospital as early as possible, your chances of getting the disease are only a little over 5 out of 100. If all contacts had gone to live with adult friends, there would have been 922 less secondary cases than actually occurred.

One might conclude that since only 12.4 per cent of family contacts under 16 years of age contract scarlet fever, the disease is not a highly communicable one. This assumption is, however, incorrect in that many of these contacts, whom we have presumed to be susceptible in the absence of any definite information to the contrary, are really not susceptible. During 1927 Dick tests made on 1,076 children under 16 years of age who had not previously had scarlet fever showed that only 291 or 27.04 per cent were susceptible. If we assume that 30 per cent of these contacts are susceptible, we change our number of susceptible contacts from 10,888 to 3,266 and our secondary case rate becomes 41.4 per cent instead of 12.4 We may conclude that while a great many people are not susceptible to scarlet fever, if you are susceptible to it and are exposed, you are quite likely to contract the disease. Of the 1,020 susceptible contacts (30 per cent of 3,399) who stayed at home with the patient, 649 or 63.6 per cent contracted scarlet fever.—*Weekly Health Rev.*—Detroit Dept. of Health, Aug. 10, 1929.

Venereal Disease Reporting in Philadelphia—Venereal diseases were made reportable in this city in 1918. Provisions were made for reporting by serial number in private cases and by name and address in institutional and clinic cases. Official records of cases reported were declared private and confidential, not accessible to the public or any person other than the official custodian of the same. Infectious cases, delinquent in treatment or otherwise constituting a public health menace, were made reportable and subjected to special investigation and disposition.

Such cases are reclaimed to treatment at sources of reporting, placarded and quarantined at home or removed to the Philadelphia General Hospital and there quarantined. Suspected and clandestine cases are investigated and properly disposed of from a public health standpoint. Every effort is made to identify sources of infection to known cases and when discovered, they are forthwith placed under immediate control. Home contacts are routinely investigated and examined for evidences of disease.

Introduced as a World War measure, under governmental supervision, the reporting and control of venereal disease came in on a popular wave. Following the return to peace these activities were sustained through the educational propaganda and vice repressive measures of the federal government in coöperation with the states. However, within recent years there has been an apparent slowing-up in these activities. The reporting of cases involving control has marked time or been actually diminished all over the country. In Philadelphia the following yearly case figures serve to illustrate this:

Year	*Cases*	*Population*
1918	1,833	1,781,346
1919	3,748	1,809,635
1920	2,716	1,837,924
1926	2,597	2,007,652
1927	2,918	2,036,000
1928	2,885	2,064,288

It may be conceded that the incidence trend of venereal diseases is on the decline, but not to the extent indicated by the reduction in the number of case reports. It has been estimated that about 60 per cent of cases of syphilis and 75 per cent of cases of gonorrhea are under treatment by the private physician. In this city only 17 per cent of the total number of cases reported are received

from the private physician. The World War case rate given this city was 37.3 per 1,000 population and the nearest approximation to this figure was 2.10 in 1919, and 1.44 per 1,000 in 1928.

It is evident that venereal disease case reporting in Philadelphia is not popular and certainly does not approximate the incidence of these diseases in a community of 2,000,000 inhabitants. As in the other communicable diseases, the health officer should be supplied with data on prevalence, geographical distribution, focuses of infection, etc., in order intelligently to direct measures for control. Such data can be supplied only by the reporting physician, and there should be no hesitancy on his part or on the part of the patient to comply with the law. The law not only protects the identity of the patient conforming thereto, but at the same time protects the innocent public from a potential focus of infection.—*Healthfax*, Philadelphia Dept. of Health, July 22, 1929.

LABORATORY

C. C. YOUNG

THE DEATH OF ANIMALS FOLLOWING INOCULATION WITH *B. SUBTILIS* OR SIMILAR BACILLI

RUTH GILBERT, M. D., AND MARION B. COLEMAN

Division of Laboratories and Research, New York State Department of Health, Albany, N. Y.

WHEN wool, bristles, or other animal products are examined for the presence of anthrax spores, it is customary to inoculate mice or guinea pigs subcutaneously with washings or with cultures made from the specimens. If *B. subtilis* or similar bacilli are present in large numbers in the inoculum and some of the material accidentally enters the peritoneum, the animals may die, and even though the presence of *B. anthracis* cannot be demonstrated in the specimens studied, stained preparations made at autopsy from the spleens of such animals may contain numerous large Gram-positive bacilli.

In 1923, a man who had carried bales of wool for delivery to a factory developed anthrax. Wool from one of the bales thought to have been handled by the patient together with burlap from the wrapper was delivered to the Division of Laboratories and Research for examination. Pieces of the burlap and masses of wool were placed in broth, incubated overnight, and guinea pigs and mice were inoculated with the cultures. The next day the mouse inoculated with the growth from the burlap was found dead and the examination of film preparations made from the spleen showed bacilli very closely resembling *B. anthracis*. Cultures from the heart's blood and spleen of this animal, however, were found to contain motile bacilli. No evidence of the presence of anthrax spores could be demonstrated in the wool or burlap submitted.

A number of cases of anthrax developed among employees of a carpet factory in another locality, in 1928. Samples of wool used at the factory as well

as material from some of the cases of anthrax were examined at a local laboratory where it was reported that anthrax bacilli were isolated in a number of instances.

Seven of the cultures from these specimens were received at the laboratory in Albany for confirmatory examination. The bacteria present in 5 of them were nonmotile and proved to be *B. anthracis*, and 2 contained motile bacilli.

Another culture isolated from a lesion on the arm of a man who had been in an automobile accident was also submitted from the same laboratory. This culture was described as being similar to *B. anthracis* in morphology, with many of its cultural characteristics, and was said to have proved virulent for two mice. It was found to contain motile bacilli, and a guinea pig inoculated subcutaneously with 1 c.c. of a heavy suspension of the organism showed no signs of illness.

The cultures of large Gram-positive spore-bearing bacilli isolated from the various sources mentioned resembled *B. subtilis* morphologically, but they did not correspond to it exactly in all of their cultural characteristics. Mice and guinea pigs are killed when inoculated intraperitoneally with 0.5 c.c. and 2.0 c.c. amounts, respectively, of a broth culture of *B. subtilis* and the bacilli can be isolated from the heart's blood. Mice were killed by all of the strains of the Gram-positive bacilli studied when inoculated intraperitoneally with an 0.5 c.c. amount of a 6-hour broth culture, while a similar dose given subcutaneously was not found to be pathogenic for them.

This experience demonstrates that in the inoculation of animals with material to be examined for anthrax spores, it is well to make the injections subcutaneously on the thigh, or in some position where there will be no danger of the material entering the peritoneal cavity. In case the inoculated animal dies, it is important to make morphological and cultural examinations for the purpose of demonstrating that the bacteria are nonmotile and correspond in other respects to *B. anthracis*.

THE "STAINED SLIDE" MICROSCOPIC AGGLUTINATION TEST

Its Application to (1) Rapid Typing of Pneumococci, (2) Determination of Antibody

ALBERT B. SABIN

Littauer Pneumonia Research Fund of New York University and the Department of Bacteriology of the New York University Medical School, New York, N. Y.

THE microscopic method to demonstrate the agglutination reaction with minute amounts of serum and organisms has been found to give reliable results. The test is performed by mixing a suspension of organisms with the immune serum on a glass slide, allowing it to dry rapidly and treating the film with a suitable stain. Agglutination in this reaction apparently occurs within half a minute, and the process has then progressed sufficiently to be observed without difficulty with oil-immersion, lens magnification. Many investigators have made stained preparations of bacteria that were previously agglutinated

either grossly in tubes or by the microscopic hanging-drop method. Neufeld (*Ztschr. f. Hyg. u. Infectionskrankh.*, 1902, xl: 54) studied microscopically the reaction between pneumococci and their homologous serums. He observed a specific reaction, characterized not only by agglutination but also by swelling of the peripheral portion of the organisms, i.e., the capsule. He also demonstrated that the peripheral swelling never led to the dissolution of the bacteria, and that it was not a bacteriolytic process. He thought that this specific reaction could be observed only in the moist state without fixation, and therefore found it unsatisfactory for practical application. A specific reaction may also be observed after drying in air, and the resulting picture resembles that obtained by Neufeld by the moist cover-slip method. The organisms are found in clumps of varying size, each embedded in a deeply staining, homogenous zone. Neufeld's explanation of a swelling of the capsule seems dubious in the light of recent work on agglutination, and it seems more likely that the zone surrounding the bacteria represents a precipitation of antibody-bearing protein on the periphery of the organisms. Saline suspensions of killed pneumococci, broth culture, colonies from blood agar plates and organisms from the mouse's peritoneum were found to give the reaction equally well. There was no disagreement in the typing of pneumococcus obtained by this method with that obtained by the old macroscopic tube agglutination, provided the test was carried out on the same material.

The importance of obtaining an early diagnosis of the type of infecting pneumococcus, especially in cases of lobar pneumonia to be treated with serum, has resulted in the development of many methods. The microscopic agglutination test just described, since it required very few organisms, was expected to reduce the time for a determination of type. Attempts to type the organisms directly from the sputum were unsuccessful. The fact that in the microscopic test the sputum was exposed to the immune serum for a very short time only, was at first thought to be responsible for the negative results. Small amounts of sputum were accordingly mixed with varying amounts of serum, and incubated in sealed capillary tubes at 37° C. for different periods of time; these mixtures were subsequently smeared and stained. The unsuccessful results are due possibly to the presence of some interfering factor or unfavorable physical conditions in the substance in which the pneumococci are coughed up. Most of the sputa injected in the mouse's peritoneum are digested within 2 hours, and in 3 to 4 hours sufficient organisms may be found to carry out a microscopic typing test. Broth may be used as a culture medium in the absence of mice, but the mouse is preferred because its peritoneum is somewhat selective for pneumococci, and because results can be obtained in a shorter time.

The procedure for microscopic typing is as follows: One c.c. of a fresh sample of sputum is injected intraperitoneally into a mouse; 3 to 4 hours after injection some of the peritoneal fluid is obtained by capillary puncture. A glass slide is marked off into 4 parts, and a minute drop of the peritoneal fluid is expelled upon each one of the 4 partitions. The first is smeared with saline for control, and the others with a loopful of a 1–10 dilution of Type I, of Type II, and of Type III, diagnostic serums respectively. This dilution of serum is chosen largely to eliminate group agglutinins. The smears are made thin, so that they dry rapidly; they are then stained for ½ minute with a fuchsin solution (10 c.c. saturated alcoholic solution of basic fuchsin plus 90 c.c. distilled water). The stain is

washed off in running water, and the smears are examined with the oil-immersion lens. If a specific agglutination reaction is observed in one of the smears with diagnostic serum, the organism is of the corresponding type. If no reaction occurs in any of the smears, and pneumococci are clearly seen, a diagnosis of group IV is made. When it is desired to know whether the organism is one of the fixed types of group IV, a similar procedure is carried out with the corresponding diagnostic serums. Naturally occurring clumps of organisms differ in appearance from those produced by specific agglutination; they can be recognized by their occurrence in the saline control smear as well. Unless a fresh sample of sputum is used, many of the organisms will have undergone autolysis and therefore more time must be allowed for growth. Since the mouse is not killed, another typing can be done if the first one should show insufficient organisms, and after death of the mouse the type may be confirmed. In the case of Type III, sufficient organisms for a microscopic typing are present as early as 2 hours after injection. The appearance of the specific reaction with Type III differs from that obtained with other types of pneumococci, primarily on account of the larger size of the capsule. More than 400 cases have already been typed by this method at the Harlem Hospital with perfect agreement as compared with the results obtained by the older methods.

MICROSCOPIC ANTIBODY TEST

It has been suggested (Park and Cooper) that the dosage of antipneumococcus serum be controlled by an antibody test on patient's blood. Taking advantage of the fact that the microscopic agglutination test requires only minute amounts of serum, it was performed on patients who had just recovered from lobar pneumonia or whose blood had been rendered anti-bacterial by therapeutic administration. Positive tests were obtained only against the homologous types of pneumococci. The technic for carrying out the microscopic antibody test is as follows:

A drop or more of the patient's blood is taken with a capillary. This is either centrifuged or, after coagulation and synaeresis, a minute amount of serum is smeared with a loopful of a heat-killed, saline suspension of the type of pneumococcus for which it is desired to determine agglutinins. The drops are thoroughly mixed and smeared very thin; allowed to dry in air; and stained for ½ minute with the fuchsin solution recommended for the microscopic typing test. The specific agglutination reaction is obtained here, but the clumps tend to be smaller.

The sensitivity of this method was compared with the rapid macroscopic method of Arlyle Noble (*J. Bact.*, XIV: 287, 1927) and the regular macroscopic tube agglutination, and it was found to be 2½ to 3 times as sensitive as either of the other methods when a standard diagnostic serum was used for the comparison.

Observations, which aim to establish with the aid of the microscopic antibody test a more exact guide for the administration of antipneumococcus serums, are being collected at Harlem Hospital.

The microscopic agglutination reaction has also been tried successfully with *B. typhosus* and meningococcus. Probably it may be applied as well wherever the older methods of demonstrating agglutination are used, and more advantageously in many instances where, without loss of time, the older methods are either unsatisfactory or impossible.

NOTE: I wish to thank Dr. William H. Park and Dr. Jesse G. M. Bullowa for their kind coöperation and numerous valuable suggestions.

VITAL STATISTICS

LOUIS I. DUBLIN, PH. D.

Heart Disease among Children and Young Adults—The crude death rate from organic heart disease has been slowly increasing. But when the mortality data for the various age groups are considered, it is found that the rise in the rate applies only to the higher age groups. Distinct improvement has taken place in recent years in childhood, adolescence, and in early adult life. Among the industrial policy holders of the Metropolitan Life Insurance Company the death rate from heart disease decreased from 24.8 per 100,000 in 1911, to 14.4 in 1928 for the ages 10 to 14 among males, and from 33.1 to 20.1 among females; in the 20 to 24-year group the rates decreased from 33.4 to 24.4 among males, and from 38.9 to 26.8 among females; in the 25 to 34-year group there was a decrease from 58.1 to 40.3 among males, and from 53.0 to 37.7 among females; and in the 45 to 54-year group there was an increase in the death rate from 288.6 in 1911, to 354.7 in 1928 among males, and from 236.0 to 252.4 among females. A rise in the death rates is shown for the 65 to 74-year group. In 1911 the rate for males was 1,649.5, as compared with 1,986.2 in 1928, and for females 1,422.8, as compared with 1,711.4. The fact that heart disease mortality is increasing after age 65 is not discouraging, since this is the age-range when approximately 60 per cent of the deaths from chronic cardiac conditions occur.—*Stat. Bull.*, Met. Life Ins. Co., 10: 1–4 (June), 1929.

Ten-Year Program for Children in Massachusetts—Since 1924 approximately 100,000 children have been examined in Massachusetts. It was found that infection with the tubercle bacillus is not as common as had been supposed. An analysis of the records showed that when children begin school life 20 per cent are infected. At age 10 approximately 28 per cent are infected, and at 15 years of age about 35 per cent are infected. Children are infected with the tubercle bacillus to the same degree regardless of nutrition or nationality if they are exposed to an open case of tuberculosis. Fifty per cent of the children who were said to be contacts reacted to the tuberculin test. It was found that children with extensive tracheobronchial glands and calcified nodules in the lungs often developed the adult pulmonary type of disease a few years later. By use of the tuberculin test it was discovered that only about one-third of the diseased cervical glands are tuberculous.

In the future the clinic will reverse the procedure that has been in use. The tuberculin test will first be given. All reactors will be X-rayed. Those showing evidence of tuberculosis or other pulmonary conditions in the X-ray film will be examined by a physician of the clinic.—Henry D. Chadwick, *New England J. Med.*, 200: 1,154–1,155 (May 30), 1929.

Scarlet Fever Carriers among School Children—Cultural examinations for hemolytic streptococcus were made on groups of school children in Arlington and Dedham, Mass. In the Junior High East School in Arlington, scarlet fever had been prevalent in the school district and 4 pupils were absent with the disease. Among the pupils of

the Junior High West School scarlet fever had prevailed in the school district, but not in the school. The disease was absent from both the Parmenter Grade School and the district. In the Dedham School and district the incidence of scarlet fever had been very high, with no reported cases for the previous 6 months. There were 297 children examined in the four schools, and 40, or 13 per cent, were found to be carriers. Of these, 33 said that they had never had scarlet fever. In the Junior High East School 11 per cent of the 97 children examined were carriers. Eight of these had never had the disease. In the Junior High West School 8 per cent of 50 examined were carriers, and in the Parmenter School 10 per cent of 50 examined were carriers. Twenty per cent of the 100 children examined in the Dedham School were found to be carriers, and 18 of these had never had scarlet fever. In the Junior High West and the Parmenter Schools the additional information relative to previous tonsillectomy was obtained. Seven, or 14 per cent, of the carriers were children whose tonsils had not been removed, while 2, or 14 per cent, were those whose tonsils had been removed.—E. A. Lane and E. A. Beckler, Carriers of Streptococcus Hemolyticus in Relation to Control of Scarlet Fever in School, *New England J. Med.*, 200: 1,283–1,284 (June 20), 1929.

Typhoid Fever in 1928—The Health Section of the League of Nations reports that during 1928 typhoid morbidity fell considerably in a number of countries. Notable among these was Germany, where there has been a steady decrease for 4 years. The number of cases dropped from 17,367 in 1925 to 7,068 in 1928. In the European part of the R. F. S. F. R. (Soviet Russia) there has been a continuous decrease since 1925 when the typhoid morbidity reached the high level of 105,062 cases. The figure of 39,445 cases for 1928 is the lowest recorded for several years. The United States also shows a steady decline in typhoid fever. In 1928, 24,335 cases were reported from 47 states. In 1925 there were 45,995 cases reported, and in 1927, 34,411 cases. Countries which showed a considerable decrease in 1928 as compared with 1927 were Bulgaria with 2,467 and 4,012 cases, respectively; Czechoslovakia with 7,795 and 8,020 cases, respectively; and Italy with 34,708 and 39,894 cases, respectively. The general decrease in the prevalence of typhoid fever in Europe may be attributed mainly to the improvement in water supply since the war. Countries where the prevalence of typhoid fever increased were: Denmark with 413 cases in 1928, as compared with 278 in 1927; France with 9,762 cases in 1928, as compared with 7,438 in 1927; and Hungary with 9,822 cases in 1928, as compared with 7,265 in 1927. In Japan the position has remained stationary for some years, the number of cases of typhoid fever being slightly greater in 1928 than in 1927.

There was no great change in the typhoid mortality rate for most countries in 1928, as compared with 1927. Decreases in death rates were shown for Austria with 2.5 per 100,000 population in 1927, as against 1.4 in 1928; Czechoslovakia with 8.8 in 1927, as against 7.9 in 1928; and Canada with 11.9 in 1927, as against 4.7 in 1928. A steady decrease in the typhoid death rate over a series of years is shown by several countries. In Germany the rate declined from 6.3 per 100,000 population in 1919 to 1.1 in 1928; in Austria from 9.7 to 1.4; in Portugal from 17.1 to 9.3; and in Czechoslovakia from 16.6 to 7.9. In the U. S. Registration Area the rate declined from 9.1 in 1919 to 5.5 in 1927.

The seasonal distribution of deaths from typhoid fever seems to reach a

maximum during the summer or early autumn months. This summer maximum is not, however, constant, even in countries with practically the same climate. The summer-autumn maximum is often followed by an increase in the curve of incidence of typhoid in the middle of winter, though the winter maximum scarcely ever attains the height of that in summer.—League of Nations, *Epidemiological Report,* p. 155 (May 15), 1929.

The Cancer Record of 1928—The crude death rate from cancer has been steadily increasing in the United States for the past 25 years. For 50 cities since 1906 the rate has increased from 71.6 per 100,000 population to 117.3, the highest figure thus far on record for American cities collectively considered. Of 143 cities, 83 showed an increase and 60 showed a decline in the death rate for 1928 as compared with 1927. Among the 10 cities with the highest rates for 1928 were San Diego, Calif., with a death rate of 214.7 per 100,000 population; Springfield, Ill., with a rate of 206.8; Sacramento, Calif., with a rate of 203.4; and Atlantic City, N. J., with a rate of 192.0. Of the 143 cities studied the rates in 1928 varied from 37.0 per 100,000 population in Highland Park, Mich., to 214.7 in San Diego, Calif. Cancer is apparently not influenced very much by population aggregates. Many of the largest cities in the United States have rates measurably below the general average. Detroit had a death rate of 72.4 per 100,000 in 1928; Los Angeles a rate of 91.5; and New York City a rate of 128.8.

In comparison with certain foreign countries the cancer death rate of the United States is not exceedingly high. For the year 1925 the average cancer death rate for the United States was 93 per 100,000 population. For the same year the rate for Denmark was 140; for Austria 139; and for Prussia 97. In the U. S. Registration States the general cancer death rate at ages 45 to 54 increased from 173.8 in 1920 to 185.7 per 100,000 population in 1925; at ages 55 to 64 the rate increased from 394.4 to 434.9; and at ages 75 and over the rate increased from 974.1 to 1,138.3. These figures show that the actual mortality from cancer in proportion to population is rapidly increasing irrespective of the tremendous progress which has been made in the treatment of the disease.—Frederick L. Hoffman, *Spectator,* 123: 3, 22–23 (July 11), 1929.

Congenital Syphilis among Dependent Children—A study of 1,000 children under the care of the Associated Medical Clinic in Philadelphia was made to determine the incidence of syphilis. The children studied were between 4 months and 16 years of age. Seventy-nine and one-tenth per cent were white and 20.8 per cent were colored. Definitely positive Wassermann reactions were given by 2.3 per cent of the children; 0.6 per cent gave a doubtful reaction; and 97.1 per cent gave a negative reaction. Of the 23 children with a positive reaction, 20 were cases of congenital syphilis and 3 of acquired syphilis. Forty-seven and eight-tenths per cent of the 23 children were white and 52.2 per cent were colored. The percentage incidence compared with the total number of white and negro children studied was 1.39 for the white and 5.77 for the colored children. Ten of the 23 children were within normal limits of weight; 5 were more than 7 per cent underweight; 4 were 10 per cent or more overweight, and in 4 the weight was not recorded.

A special study of 200 of the children between the ages of 4 months and 5 years showed that the incidence of syphilis in this group was 1.5 per cent. The percentage of illegitimacy in the group was strikingly high, 105, or 52.5 per

cent, of the 200 children being of illegitimate birth. Among the entire group of 1,000 children studied the percentage of illegitimacy was 17.3 per cent. The physical signs of congenital syphilis are often so obscure that it would seem advisable, at least in a clinic for dependent children, to perform a Wassermann test of the blood on every child.—H. H. Jenks and J. D. Donelly, *Am. J. Dis. Child.*, 37: 1,198–1,202 (June), 1929.

Peptic Ulcer—An analysis was made of 556 cases of gastric and duodenal ulcer admitted to the Peter Bent Brigham Hospital, Boston, Mass., from 1913 to September, 1926. Seventy-two and eight-tenths per cent of the patients were male and 27.2 per cent were female. The average age at which symptoms of ulcer were first noticed was 36.8 years. There were only 9 families in which peptic ulcer was known to exist. In addition there was a history of stomach trouble in 37, which was fatal in 19 cases. Five per cent of the patients had hypertension, and 6 per cent had generalized arteriosclerosis. No other disease occurred frequently enough in the past history to suggest an association with ulcer. The average duration of symptoms at the time of entry was 7 years. Sixty-three per cent had had symptoms for more than 2 years. Hyperacidity occurred in 50 per cent of the cases, and hemorrhage in 34.8 per cent. Cancer was found in 4.4 per cent of the cases with gastric ulcer. Twenty of the 556 patients died from ulcers; of these 8 died from hemorrhage and 6 from perforation of the ulcer without operation. Twenty-one died following an operation to cure the ulcers.

The results of treatment were observed in 460 cases which were followed for periods varying from ½ to 13 years. As a result of treatment, 37.8 per cent of the patients showed good results and 40.6 per cent were unimproved. Two hundred and forty-eight patients had surgical treatment. Of these, 44.8 per cent showed good results, as compared with 40.6 per cent who were unimproved. Medical treatment was given to 186 patients without a previous operation. The results in 29.8 per cent were satisfactory, as compared with 48.7 per cent which were unsatisfactory. The results of all forms of treatment showed that about 60 per cent of the patients were relieved after an average observation period of 4 years.

All evidence points to the fact that ulcer is a chronic disease and that all the present methods of treatment are merely palliative.—Edward S. Emery and Robert T. Monroe, *Arch. Int. Med.*, 43: 846–873 (June), 1929.

INDUSTRIAL HYGIENE

EMERY R. HAYHURST, M. D., AND LEONARD GREENBURG, PH. D.

Occupational Poisoning in Manufacture of Luminous Watch Dials—This paper presents a general review of the hazard caused by the ingestion of luminous paint, with special reference to the New Jersey cases, and is reprinted from the *Journal of the American Medical Association* of February 9 and 16, 1929. This is an excellent summary of the facts concerning the radium poisoning cases in New Jersey and the various reports made on these cases by Dr. F. L. Hoffman, Drs. Castle and Drinker, Drs. Reitter and Martland, and Dr. Flinn. The report calls attention to the national survey of this problem that is being conducted by the U. S. Public Health Service.—Harrison S. Martland, M.D., *Month. Labor Rev.*, 28: 6, 1242–1275 (June), 1929.

L. G.

Radium Poisoning—The Bureau of Labor Statistics has just completed a study of the effects on the health of workers of the use of radioactive substances, especially in the painting of watch dials. Inspections were made in 31 establishments in which some 253 workers were directly subjected to possible exposure to radioactive substances. A total of 23 fatalities and 19 living cases were found as a result of this study. The largest number of cases was among watch dial painters, in all totalling 33. The period of service ranged from 14½ months to over 12 years. Apparently all of these workers were in the habit of pointing their brushes between their lips until this custom was prohibited in 1925.

It is recommended that special precautionary measures be adopted to protect the workers in this country against the insidious effects of radioactive substances. A rigid physical examination should be made of all prospective workers to insure their fitness for such occupation, and after employment thorough physical examination, including blood studies and radioactive tests, should be performed every 2 months. Continuous employment should be limited to 2 years.

The remainder of the recommendations refer to the condition and maintenance of the workroom, the storage of radioactive materials, and the handling of radioactive material by the worker. The case histories of 42 cases of radium poisoning are reported in some detail.—*Month. Labor Rev.*, 28: 6, 1200–1241 (June), 1929.

L. G.

Dry Ice—A New Industrial Hazard—The *Monitor* of April, 1929, calls attention to the fact that solid carbon dioxide, known as dry ice, has been the cause of 5 claims for injuries filed with the Ohio Industrial Commission. The ice is used to freeze the core or center of golf balls. Apparently, the practice has been to place these cores in contact with the dry ice and then at the proper time to remove them to a winding machine for completion. The removal of the core is accomplished by hand and apparently produces its effect through the local freezing of certain portions of this member.

In each of the 5 cases reported, the nerves of the fingers, hands, and forearms were affected to such an extent that a neuritis was produced. Twitch-

ing of the arms was an early symptom with numbness and an inability to distinguish between heat and cold, and finally in some cases pain and inability to use the hand. Two of the cases were mild with a 10 to 14 days disability. Others were more prolonged. In one plant a device was installed by which the cores were removed from the containers without contact with the hand. This appears to have eliminated the occupational hazard.—*Month. Labor Rev.*, 29: 1, 96 (July), 1929. L. G.

The Dust Hazard in the Abrasive Industry—This paper presents a second study of workers engaged in the artificial abrasives industry, the first study having been completed and published in 1925. Essentially the task undertaken was a review of the subsequent history of 79 men previously studied, and a comparison of the 1924 with the 1928 X-ray findings, and finally a report of the X-ray findings of the other group of workers who have been exposed to abrasive dust inhalation for 10 years or longer. It is concluded that the inhalation of artificial abrasive dust composed of aluminum oxide or silicon carbide will not produce disabling silicosis in the working period studied. The X-ray pictures failed to reveal any cases of third stage silicosis. The author feels that it is possible for men with arrested tuberculosis processes to work in artificial abrasive industry for a considerable period of time without relighting the processes.—W. Irving Clark, M.D., *J. Indust. Hyg.*, 11: 3, 92 (Mar.), 1929. L. G.

The Cost of Free Advice. Tuberculosis in an Industrial Group—As a result of this study, the annual tuberculosis admission rate among railroad employees was found to be 1 case per 800 persons. The cost to the hospital association for the treatment of far advanced cases was found to average $4,600; for a moderately advanced case, about $1,000; and for the minimal, about $500. It is pointed out that the underlying cause of delay in diagnosis appears to be a tendency on the part of the laymen and doctors alike to ignore the commonplace knowledge of the prevalence of tuberculosis and its earlier symptoms. The importance of being tuberculosis-minded is emphasized, and it is pointed out that free medical service without special attention to the prevention and detection of tuberculosis would not serve to control the disease in this industrial group.—E. W. Phillips, M.D., *J. Indust. Hyg.*, 11: 4, 107 (Apr.), 1929. L. G.

Chrome Poisoning—Attention is called to a recent summary of the available information concerning chrome poisoning which was compiled by the National Safety Council. This report calls attention to the use of chromates in the manufacture and preparation of chromium and chrome colors; color photography; match manufacture; the tar color industry; manufacture of wet batteries; bleaches of fats, waxes and ointments; textile printing; chromium plating; the staining of wood and chromium tanning. According to this report the occurrence of systemic poisoning is doubtful and bronchitis is but occasionally seen.

The more usual symptomatology is referable to the conjunctiva, skin irritation and ulcers on the hands and nasal mucous membrane. It is suggested that washing with a 5 per cent solution of sodium bisulphite is beneficial in that it renders the chromic acid radical inert, and zinc or borax ointment is recommended as a dressing for ulcers. As a wet dressing a lotion of equal parts of calamine and boric acid is suggested.

Preventive measures include the enclosing of machines for the grinding of raw materials, the use of local exhaust ventilation, the use of efficient respira-

tors and impermeable rubber gloves. The anointment of face, hands and arms with a mixture of petrolatum, 3 parts, and lanolin, 1 part, is suggested as a means of preventing skin eruptions.—*Month. Labor Rev.*, 28: 5, 1036–1037 (May), 1929. L. G.

The Noise Evil—The Berlin Chamber of Commerce has adopted 13 resolutions pertaining to the nuisance and danger of noise. These are translated and printed in full in the *J. A. M. A.*, 93, 5: 397–398 (Aug. 3), 1929.

Occupational Diseases: Definition, Cause, Prevalence, and Prevention—This paper was presented before the New England Health Institute at Hartford, Conn., April 23, 1929. It is a very interesting and inclusive contribution and defines occupational disease and shows how specific occupational diseases are the result of existing health hazards. That there are national peculiarities in occupational disease is at once evident when one realizes the national variations in occupation. It is pointed out that in 1924 there were 9 state departments of labor and 21 state health departments receiving, or supposed to receive, reports of occupational diseases, and a discussion is presented showing the functioning of these regulations in many states and territories.

Dr. Hayhurst has laid down 3 principles or provisions emphasizing that the cost of production should include the cost of health conservation in the presence of health hazards; knowledge regarding health hazards and the provision of safe and proper work places is a prerequisite of every employer; and finally the health of the individual is an affair of the state, since in dependency the burden naturally falls on the state. The provisions of the health department should include an occupational disease reporting law or regulation and an office or division of occupational diseases for investigative and research purposes.—Emery R. Hayhurst, M.D., Ph.D., *Month. Labor Rev.*, 29: 1, 29–51 (July), 1929. L. G.

The Present Status of Benzene (Benzol) Poisoning—The present-day standards for diagnosing benzol poisoning are classified in one state under symptoms of local irritation, of anemia, and of nervous symptoms, while the diagnostic criterions rest upon (1) exposure to benzene at work, which (2) together with any one or more of the symptoms outlined, should warrant a tentative diagnosis, while (3) the finding in addition of a red blood count of less than 4,000,000, or a white count of less than 5,000 in addition should warrant a positive diagnosis of benzene poisoning. However, true benzene poisoning may exist without any leukopenia, and, in fact, in the presence of a leukocytosis. The various circumstances in which normal persons may show some of the blood findings of benzene poisoning, particularly leukopenia, are next discussed. Again other simulating disease conditions must be considered. The infectious leukopenia of Schultz, or agranulocytosis, may occur in the streptococci and pyocyanic infections, with accompanying hemorrhage and inflammation of the gums.

The question of benzene as a toxic entity is somewhat controversial, since there are no published reports on the action of extraordinarily pure benzene. The commoner contaminants are hydrogen sulphide, toluene, and bisulphide of carbon (50% often), according to Herrington.

Lewin, Lehmann and Schwenke have all reported that purified benzene is less toxic than crude varieties. There is, however, no intent to deny or question the actuality of benzene toxicity. Yet a group of 40 japanners, who daily spent from 6 to 8 hours coating cow

hides with enamels containing from 25 to 60 per cent benzene, in a room without artificial ventilation, for a period of more than 10 years, and without regular medical control, have not developed one case of benzene poisoning, other than dermatitis. No claim has ever been made for compensation and medical service, or for loss of time. Such a situation invites a further study of the subject.

Despite Hamilton's contention in 1928, of the lessening menace of benzol poisoning in American industry due to an alleged marked decrease in its use in the past 6 years, McCord points out such is not borne out by statistics on the production of benzene for the period mentioned, and he exhibits a table taken from the U. S. Tariff Commission which shows that, whereas slightly over 60 million gallons were consumed in the United States in 1922, the amount reached 99½ million gallons in 1925, and was over 86 million gallons in 1927.

Need of further work with reference to benzene toxicity is therefore indicated, and the author suggests five different lines of investigation.—Carey P. McCord, *J. A. M. A.*, 93, 4: 280–283 (July 27), 1929.

Lead Dust Hazard—Dr. R. E. Lane (Manchester) read a paper on this subject before the Section on Occupational Diseases of the British Medical Association, in which he emphasized the respiratory tract as by far the most important portal of entry for lead. Normal, healthy people both excreted lead in the urine in measurable quantities and showed minor degrees of basophilia. In research he had carried out he had found a definite relationship between the lead in the atmosphere, the lead excreted in the urine, and the basophilia content: the basophilia could be used in estimating the hazard. "He supported the findings of Sellars that all lead workers have a normal punctate basophilia, and that its mere presence cannot be taken as a proof of lead poisoning." It was, however, a delicate index of the degree of absorption, and as such of great value in anticipating trouble.—*Lancet*, 5528: 283 (Aug. 10), 1929.

The Present Position of Silicosis in Britain—This subject was discussed by the Section on Occupational Diseases of the British Medical Association at its Manchester meeting. Dr. E. L. Middleton, H. M. Medical Inspector of Factories, pointed out that in the pathology of silicosis the particles of silica were phagocyted and the lymphatic channels contained deposits of these cells, which produced a reaction in the surrounding tissues, so that fibrous tissue formed which underwent contraction resulting in distortion, with loss of function of the remaining lung tissue. Sections of the lung showed nodules formed in a whorled arrangement of fibrous tissue, and often particles (if 5 mu in diameter) could be demonstrated by polarized light. When free from other dusts of an irritating kind, silica was inhaled by workers without suspicion that they were exposed to dangerous dust. Dyspnea was usually the first symptom, and might follow exposure at any time of 2 to 40 years. In diagnosis, the employment history should be exhaustively studied, while a careful clinical examination, and a radiographical examination by an expert are essential. Prognosis depended upon: (1) the amount of dust inhaled; (2) the period of time over which this acted; and (3) the occurrence of infective processes, tuberculous or non-tuberculous. If taken in an early stage it seemed that the disease could be arrested.

The industries in which silicosis occurred were the *Refractories Industry* manufacturing ganister and silica bricks, where a specialist medical board now carries out medical examination of all

of the 2,000 to 3,000 persons employed. In the *Sandstone Industry* where silica is most widespread, the diminishing incidence of silicosis is considered due to the application of water and mechanical methods of dust suppression. The *Granite Industry* showed complicated pictures because of the varying proportions of quartz, felspar and mica present in the rock. The *Slate Industry*, as the result of an inquiry, showed some evidences of fibrosis of the lungs, but the occurrence of actual disability within the ordinary working lifetime of workers was not clearly shown. In the *Grinding of Metals* where silicosis with tuberculosis was at one time extremely prevalent, the replacement of sandstone wheels with other types of abrasive wheels, such as carborundum, had greatly modified the affliction. *Sand-blasting* of metals and glass was a matter for serious consideration, and one to determine whether a substitute such as iron or steel grit could not be used. In *Pottery Manufacture*, "potter's asthma" was probably due to flint dust, but the evolution of dust is now controlled by the use of mechanical means. *Tin Mining* in Cornwall had a high mortality rate from tuberculosis, and it was shown that this was associated with silicosis. Now the drilling is done through hollow steel with a water feed. Silicosis also occurred in *Coal Miners* employed on hard headings. It seems that once enough silica had been inhaled to produce the nucleus of fibrosis, the following inhalation of coal dust increased the fibrosis and produced disability. Dr. Middleton pointed out that "there was no criterion of air dustiness which could safely be regarded as indicating freedom from risk of producing the disease."

Dr. P. Heffernan, Tuberculosis Officer, Derbyshire, in a paper on the biophysics of silica and the etiology of silicosis, considered the action of silica as physicochemical in nature, and that alkalis favored the formation of silica hydrosol which increased the development of silicosis, while substances such as carbon, coal dust or clay which retarded the formation of silica hydrosol, retarded silicosis. Silica was a normal constituent of plant and animal cells and had a place in therapeutics comparable to that of lime. Dr. Watkins Pitchford (South Africa) uttered a warning about wet operation, since siliceous mud was potentially siliceous dust.—*Lancet*, 5528: 282–283 (Aug. 10), 1929.

Occupational Diseases and Social Legislation—Social insurance against occupational diseases was first adopted in Germany in May, 1925. As the act brought under insurance only a small proportion, a new act was adopted February 11, 1929, which increases the number of listed occupational diseases from 11 to 22. The newer alterations concern cutaneous disorders, disorders of the muscles, bones and joints, from work with compressed air; deafness from excessive noise in metal working; silicosis (pneumonoconiosis) in sandstone quarries, etc., including coincident pulmonary tuberculosis; typical disorders of sailors (tropical diseases, typhus, scurvy); and infections among the personnel of hospitals, etc. "Accident insurance shall apply to occupational diseases irrespective of whether the disease is caused by an accident or by an injurious action that cannot be classified as an accident." All physicians are compelled to report every case of occupational disease, even though only a suspicion exists. If the fear is justified that an occupational disease will develop, a transitional benefit shall be paid which shall not exceed half of the full benefit and for so long as the worker refrains from working in the menacing industry. Sometimes disability benefit shall be paid in addition to the transitional benefit.—Berlin Letter, *J. A. M. A.*, 93, 6: 473 (Aug. 10), 1929.

FOOD, DRUGS AND NUTRITION

WALTER S. FRISBIE

The Effect of Excessive Doses of Irradiated Ergosterol on the Calcium and Phosphorus Content of the Blood—Reference is made to the work of Hess, Weinstock and Rivkin (*Proc. Soc. Exper. Biol. & Med.*, 26, 199) in which it is reported that in young rats on a diet high in phosphorus and very low in calcium, serum calcium was raised to normal by the daily administration of 1 mg. of irradiated ergosterol. In the work here reported, adult animals were used and the calcium intake was not restricted. Rabbits were the experiment animals on unlimited diet of oats and cabbage leaves. One group received a daily dose of 0.5 c.c. of arachis oil, the second, 0.5 c.c. arachis oil with 10 mg. non-irradiated ergosterol, and the third, 0.5 c.c. arachis oil with 10 mg. irradiated ergosterol (irradiation in alcohol). Calcium and phosphorus determinations made periodically showed no change until 25 days after the beginning of the experimental dose. The following day, in the case of two rabbits increased amount of phosphorus was noted but the calcium was normal. Two weeks later the phosphorus was 50 per cent above normal, with a slight increase in calcium but no change in the controls. Post-mortem examination showed the calcium in the kidney and the urine was saturated with calcium salts. Since deficiency of vitamin D results in low blood phosphorus or calcium, or both, it was concluded that excess of this vitamin may result, depending on the diet, in high phosphorus or calcium, or both. In an experiment performed on young rats in which the irradiated ergosterol (0.1 per cent of the diet) was given for 14 days, loss of weight resulted and high inorganic phosphorus and increased serum calcium, respectively 50 per cent and 25 per cent above normal. The increase in inorganic phosphorus which appears to precede the hypercalcemia is being studied.—Leslie Julius Harris and Corbett Page Stewart, *Biochem. J.*, 23: 206, 1929.

Bacteriological Studies of Sulphide Spoilage of Canned Vegetables—Outbreaks of sulphide spoilage occur sporadically in sweet corn and pea canneries. Such outbreaks generally involve a substantial part of the season's pack, and in several instances the entire season's pack has been so heavily contaminated that salvage was impracticable. In this bulletin a report is made regarding the cause of the condition and the identification of the microörganism responsible. It is reported that sulphide spoilage, characterized by an odor of hydrogen sulphide and some darkening of the product but no swelling of the container, is caused by the growth of an anaerobic spore-forming thermophile to which has been given the name, *Clostridium nigrificans*. The organism is a thermophile growing at an optimum temperature of 55° C. *Clostridium nigrificans* has proved to be one of the most heat resistant bacteria. Exposed to a temperature of 100° C. at pH 7.0 the spores remain viable for as long as 8 hours. Processing at 118° C. (245° F.) for 70 minutes has not proved effective in destroying the spore of *Cl. nigrificans* in No. 2 cans of sweet corn. The organism was not pathogenic

when ingested by man, guinea pig, mouse, rat, or rabbit. It is desirable in the control of *Cl. nigrificans* to eliminate the foci of infection in the cannery and prevent the presence of spores in the product. The organism occurs in the soil, in manure and on sugar, and probably finds its way into the cannery in these materials, where it may set up a focus of infection. There is little possibility of the organism causing spoilage in vegetables other than peas and sweet corn.—C. H. Werkman, Iowa Agri. Exper. Station Research *Bull. No. 117*, May, 1929.

Hypervitaminosis and Vitamin Balance—Part II. The Specificity of Vitamin D in Irradiated Ergosterol Poisoning—The work here recorded was undertaken to demonstrate whether the effects of hypervitaminosis evidenced in young rats were due to the vitamin *per se* or to accompanying toxic substances as has been alleged. The British drug firm which supplied the specimen stated that their observation was to the effect that ergosterol irradiated in alcohol showed toxic effects but that ergosterol irradiated in oil without the use of alcohol did not show the usual hypervitaminosis. Three separate experiments were undertaken, one in which over-irradiated ergosterol was used; one in which oil irradiated was compared to alcohol irradiated ergosterol; and the third in which the ergosterol was irradiated without the use of a solvent. In the first experiment, over-irradiated ergosterol was prepared from a specimen of the irradiated product which had proved toxic.

Three groups of rats were fed the same basal ration supplemented with non-irradiated ergosterol, with irradiated ergosterol, and with over-irradiated ergosterol. In the latter two the concentration was the same, 0.1 per cent of the diet. Animals on irradiated ergosterol lost weight and appetite, showed diminished heart beat, and died in 20 to 34 days with post-mortem evidence of deposits of calcium salts in various organs. Those on over-irradiated ergosterol were comparable with those on the non-irradiated with no abnormalities evidenced on autopsy.

In a second experiment rats were divided into 3 groups, one on a diet containing 0.025 per cent alcohol irradiated ergosterol, one group with the same concentration of ergosterol irradiated in oil, and the third group, the control, without ergosterol. The results showed no difference in degree of toxicity between the two types of irradiated ergosterol, death occurring at the same time in both groups.

Post-mortem examination showed diminution of spleen, atrophy of thymus, and calcium deposits in kidneys, aorta and heart. In the third experiment ergosterol was employed which had been irradiated in a thin film in an atmosphere of nitrogen and was incorporated in the diet at 0.1 per cent level. While the animals grew almost normally, after 28 days the autopsies revealed extensive deposits of calcium in the internal organs as in the other experiments.

The authors believe that if the toxic effects were due to impurities in ergosterol, these would persist in the case of the over-irradiated product, at least, that it would be an unusual coincidence otherwise. The pathological symptoms of hypervitaminosis are discussed, the important features of which are remarkably high blood-phosphate, diminished pH of the feces, diminished heart rate, and atrophy of the thymus. There is both a low and high threshold value for vitamin D, below which typical deficiency symptoms appear and above which increased blood-phosphorus and calcification with or without increase in blood-calcium.—Leslie Julius Harris and Thomas Moore, *Biochem. J.*, 23: 261, 1929.

Studies on the Nutritive Value of Milk. II. The Supplementary Value of Inorganic Iron and Copper—A previous paper by this author (*A. J. P. H.*, XIX, 5 (May), 1929) records the production of anemia in young rats by feeding exclusive whole milk diets. A continuation of the milk feeding experiment made necessary a supplement which would prevent this anemia. Iron was the first supplement tried, a solution of ferrous sulphate being made so that 1 c.c. contained 0.4 mg. iron. The growth results were unsatisfactory as were those when ferric citrate was used. The condition of the rats resembled xerophthalmia. A colloidal solution of ferric oxide was prepared and fed at the same level but anemia developed, although the rats were in better condition than those on the iron salts. Copper was used and 0.16 mg. of the metal as copper sulphate was added to the milk of one group and 0.2 mg. iron as colloidal ferric oxide was given to the other group. The addition of iron alone resulted in good growth but did not prevent decreased hemoglobin. When the copper supplement was added, there was a response in weight and increased hemoglobin. Copper alone resulted in growth and a rise in hemoglobin content to normal. This is not attributed to iron impurities in the copper but since milk supplies only 0.1 to 0.2 mg. it is concluded that either iron is required for hemoglobin formation or that present in the milk is made more available by the copper. The work apparently indicates a deficiency of milk in copper as well as in iron content. No offspring has ever been produced from mixed lots of rats on this diet, indicating the possibility of an adverse effect of copper and iron supplements on reproduction.

The production of nutritional anemia offers an opportunity to study the nutritive effect of exclusive whole milk diets.—W. E. Krause, *J. Dairy Sci.*, 12: 242 (May), 1929.

Iron in Nutrition. VIII. The Ineffectiveness of High Doses of Iron in Curing Anemia in the Rat—Reference is made to a report (Abstract, *A. J. P. H.*, 18: 1058 (Aug.), 1928) that inorganic iron at a daily level of 0.5 mg. was ineffective in curing nutritional anemia in rats. It was observed, but not reported, that 2 mg. of iron would stimulate hemoglobin regeneration. This observation raised the question as to the purity of the iron, and an experiment was undertaken in which specially purified iron was used. Purified ferric chloride was fed to anemic rats at 2, 5 and 10 mg. levels daily, 6 days a week. Similar amounts of iron not especially purified were fed to other groups.

The growth curves and tables show that the unpurified ferric chloride increased the hemoglobin level over an experimental period of 14 weeks, while those receiving specially purified iron salts made no progress in hemoglobin regeneration and did not increase in body weight.

There were exceptions in 2 individuals on the pure iron which did show some regeneration and this is attributed to the possibility of excess reserves of copper. The authors conclude that this is the explanation of the conflicting reports in the literature as to the effect of iron salts on hemoglobin formation since the iron wire before special purification was a high grade product used for standardization.—J. Waddell, H. Steenbock, and E. B. Hart, *J. Biol. Chem.*, 83: 243 (July), 1929.

IX. Further Proof That the Anemia Produced on Diets of Whole Milk and Iron Is Due to a Deficiency of Copper—As the result of previous experiments on the influence of copper in hemoglobin formation, the question was undecided as to whether copper is the only element which can supplement iron in this phenomenon.

A commercial liver preparation (Eli Lilly and Company) was ashed and the copper separated from it by electrolysis. This electrolytic copper with the residue was fed to anemic rats at a level representing 0.3 gm. of the original preparation (0.05 mg. Cu). In addition, rats were fed 0.05 mg. Cu as copper sulfate. Hemoglobin level and body weight increased in the groups fed the electrolyzed copper and the copper sulfate, but the residue after electrolysis was not effective.

Another experiment was performed in which the liver preparation, a hydrogen sulfide fraction of the acid extract of the ash of this preparation, and copper sulfate were compared. The quantities taken provided for copper ranging in amounts from 0.001 to 0.03 mg. of Cu. In other experiments various liver preparations were fed introducing similar amounts of copper.

Not all of the results of these experiments involving 15 litters of rats are published, but the results are stated to be uniform for all of the additions of copper. Hydrogen sulfide fractions of the ash extracts were as potent as the preparations and equivalent to the copper introduced as sulfate.

The authors conclude that this is convincing proof that the diet deficiency is inorganic and that it is copper only.—J. Waddell, H. Steenbock, C. A. Elvehjem, and E. B. Hart, *J. Biol. Chem.*, 83: 251 (July), 1929.

The Effect of Diet on the Copper Content of Milk—As an extension of the work (Abstract, *A. J. P. H.*, 18: 1059 (Aug.), 1928) on the influence of copper in prevention of anemia in rats on a milk diet, the amount of copper actually present in the milk of cows and of goats has been studied, as well as the effect on milk in administering additional copper. Weekly samples of milk for a period of 4 weeks were taken from Holstein cows on standard ration. The daily intake of copper in food was found to be approximately 60 mg. At the end of 4 weeks, 5 times this amount (1.2 gm. of $CuSO_4 . 5H_2O$) was added to each cow's ration.

Samples of milk were also collected from various sections of the United States and analyzed for copper. The materials were ignited in porcelain dishes which had been previously extracted so as to be copper-free. The copper content of the milk from cows on the basic ration was found to average 0.15 mg. per liter, lower than most of the figures found in the literature. The milk after the supplement of copper salts was found to contain practically no more copper, indicating the copper content of the milk not to be increased by feeding additional copper in the amounts recorded in this experiment.

Milk from various sections of the United States varied from 0.123 mg. per liter (North Carolina) to 0.184 mg. per liter (Texas), indicating the copper content practically uniform under various conditions.

The copper content of goat milk was about the same as that of cows and the addition of 50 to 25 mg. of copper daily to the ration did not change the copper content of the milk. The authors point out that the amount of copper in milk samples confirms biological findings and conclude that the different rates of hemoglobin reproduction reported by investigators are due not to variations of the copper content of the milk but to contamination after production or to unknown sources of copper.—C. A. Elvehjem, H. Steenbock, and E. B. Hart, *J. Biol. Chem.*, 83: 27 (July), 1929.

CHILD HYGIENE

MERRILL E. CHAMPION, M. D.

A New Theory of the Cause of Dental Caries—" The etiology of dental caries as taught today was first formulated by W. D. Miller. He showed that the bacterial fermentation of carbohydrate food particles remaining upon the teeth forms lactic acid, which attacks their mineral constituents, while the organic basis substance is destroyed by another type of bacteria. Thus a cavity is formed in the tooth.

" A further and important contribution was made by Bunting, who found that a certain type of bacteria, *Bacillus acidophilus*, is always present during the decay of the teeth.

" That this presentation of the cause of dental caries does not completely explain the varying occurrence of this disease is proved by the number of investigations that have been undertaken since the time of Miller. These investigators have felt that Miller's theory does not explain the disease in all its phases, as the following exceptions can be noted:

" 1. Teeth do not *always* decay in the presence of food debris.

" 2. There appears to be an increase in susceptibility to dental decay during pregnancy and systemic illness.

" 3. Pulpless teeth often seem to be more prone to decay than vital ones.

" 4. The occurrence of approximal decay, affecting only one of the two adjacent teeth.

" 5. That mottled enamel, which appears to be poorly calcified, is not more susceptible to decay than normal enamel.

" We note, therefore, that the present theory of decay does not explain all its phases.

. . .

" The resistance of the teeth to decay may be explained by the presence of the dental lymph, which is normal only so long as that individual is in a healthy condition. This is as yet purely a theory, which, however, is based upon the following data:

" 1. A system of channels has been proved to be present in both the dentin and the enamel.

" 2. These channels have been proved by laboratory and by animal experiment to be permeable from the pulp chamber up to the surface of the tooth.

" 3. Blood plasma is known to contain free mineral salts, which neutralize lactic acid in other parts of the body and vary in quantity, depending upon the health of the individual.

" It is therefore plausible that normal dental lymph passes through the dentin and enamel of the teeth of man as well as those of the dog, and that it neutralizes whatever acid it encounters, thus inhibiting dental caries. A great deal of work, however, remains to be done to check up various phases of this theory. Nevertheless, even in its present stage of incompleteness, this theory gives for the first time a logical explanation of all clinical exceptions noted at the beginning of this paper.

" My view of the factors governing the relation between dental decay and systemic health is stated concisely as follows:

" I. Exciting cause of dental caries. Carbohydrate food decomposes in the presence of bacteria, forming lactic acid (Miller).

" II. Predisposing cause. Quantitative and qualitative changes of the dental lymph, diffusing to all free surfaces of the crowns of the teeth: (a) Dental lymph is derived from the blood plasma: (b) if the mineral content of the dental lymph is sufficiently high, it will neutralize the lactic acid on the sur-

face of the tooth and no decay can result; (c) if the mineral content of the blood plasma is decreased through systemic illnesses, it causes a corresponding reduction in the character of the dental lymph and therefore an insufficient neutralization of the lactic acid, resulting in dental caries; (d) variations of the mineral content of the dental lymph are dependent upon the character of the blood plasma, which are in turn affected by the general health of the individual, thus establishing a close relationship between the enamel and dentin of the teeth and the body as a whole."—Charles F. Bodecker, D.D.S., F.A.C.D., *Dental Cosmos*, June, 1929.

A Plea for Simplicity—In this timely article, Dr. Griffith urges greater simplicity in the teaching of pediatrics. He finds several sources to blame for the lack of direct teaching of the principles which will be of use to the young practitioner who must work his way up through general practice. The graded course, excess of laboratory work, and the methods used in the teaching of pediatrics itself, all come in for their share of blame. "The question then is, what have we taught him (the medical student) upon which he can now fall back? How much has been taught by us as to the actual handling of the sick child, and, even more important, of the mother of the sick child?"

Dr. Griffith criticises his own teaching no less severely than that of others. He suggests that simplicity in teaching undergraduates might well extend to the teaching of graduates through medical literature, and remarks: "The inclosure in them of unimportant or confusing things is often true of our textbooks which frequently contain much that could well be omitted."

He also remarks that many of the articles published today "show only a disposition on the part of the writer to get into print ahead of someone else."

The *Standard Dictionary* definition of "pediatrics" as "the department of medical science that relates to hygienic care of children and treatment of the diseases peculiar to childhood" is accepted.—J. P. Crozer Griffith, M.D., *Arch. Pediat.*, May, 1929.

Ovarian Irradiation and Health of Subsequent Child—"Murphy delivers his second communication dealing with the health of children born following maternal pelvic radium or roentgen irradiation. An attempt has been made to determine the nature, seriousness and frequency of any disturbances of health or defects in development among these children, and to ascertain, if possible, whether the maternal irradiation was entirely or only partly responsible for such faulty structure or disturbances of function as may be found among them. From the study of the literature and from an estimation based on the replies to a questionnaire, it seems apparent that relatively few children have been born to women who were subjected to pelvic irradiation. Fifty-three women are reported on who received postconception pelvic radium or roentgen irradiation. Abortion occurred in 23 instances (43.4 per cent).

"Of the 30 children born at term, 12 (40 per cent) presented some more or less serious disturbances of health or development. These defects, in many instances, were quite serious and tended to conform somewhat to a type. Two hundred and thirty pregnancies are reported on, occurring in women who received preconception pelvic irradiation. Abortion occurred in 50 (21.7 per cent) instances. Of the 180 children born at term, 27 (15 per cent) presented some disturbance of health or defect in development. These defects were much less severe than those occurring in the preceding group and did not conform in any way to a type. There is as yet no definite indication that ovarian irradia-

tion, prior to fertilization, has any detrimental influence on the health or development of any subsequent children." —D. P. Murphy, *Surg., Gynec., Obst.*, June, 1929 (abstracted by *J. A. M. A.*, July 20, 1929).

Birth and Death Rates for 1928—The U. S. Public Health Service in its *Public Health Reports* for August 2 summarizes the provisional birth, death and infant mortality rates for 1928 as given out by the U. S. Department of Commerce. These are for the birth registration area exclusive of Massachusetts and Utah.

The birth rate dropped one point during 1928 (19.7 as compared with 20.7 for 1927). The highest rate was in North Carolina (27.5 per 1,000 population). The death rate for 1928 for the above group of states was 12.3 as compared with 11.4 for 1927.

The infant mortality, too, has gone up several points, showing a rate of 68 for 1928 as contrasted with 64.6 for 1927. Oregon showed the lowest rate, namely, 46.9.

Jolts like this, coming as they do about every other year or so, ought to be good for public health workers, teaching us humility. But it does not work out that way at all. Credit is always claimed for all reductions, but a discreet silence is maintained regarding increases. What a relief it would be if some time propaganda were to be replaced by statements of sober facts and a little more effort put into teaching the public what the facts really mean.

School Health Supervision in Detroit—For the past few years the city of Detroit has been carrying on what is generally recognized as a most interesting experiment in school health supervision. The following summary of present practice in that city is contributed by Dr. Don W. Gudakunst:

The so-called Teacher Health Inspection System has been in operation in the Detroit Schools since 1921.

It has met with the unqualified approval of the Board of Education, the school principals and teachers. The School Health Service, which is under the administration of the Board of Health, has found this plan to be of the greatest help.

All school teachers in the City of Detroit are given a course of lectures and demonstrations as to the means of detecting any physical defects, or any indications of defects of vision, hearing, tonsils, teeth, skin and posture. Each child receives an inspection from his teacher early in the school year. Those children whom the teachers find to have some indication of defects are referred to the school physician for a more careful examination.

By this means those children most in need of medical examination are assured of such care. In a school system as large as Detroit it would be impractical to give an examination to each child every year.

Analysis of the markings of the teacher and of the physician shows very high corre'ation. However, no notification of the defect is sent to the parent based solely upon the teacher's inspection. Her work is used merely as a screen to pick out those children most urgently in need of medical care. This system has proved so popular in Detroit that it has spread on a purely voluntary basis from a few schools in 1921, to all of the public schools for the past few years, and now has been taken up by many of the private and parochial schools.

PUBLIC HEALTH NURSING

EVA F. MACDOUGALL, R. N.*

Looking **Ahead**—The student nurse of today is the public health nurse of tomorrow, and the public health nursing group has a very direct responsibility for following and aiding the work of the League of Nursing Education. Much good has come to the nursing profession through legislation since the days of Florence Nightingale, but "there's many a slip" in laws already passed, while excellent bills, awaiting legislative action, meet with little or no success. The article by Miss Burgess embodies the ideals of the National League of Nursing Education, and enumerates three projects, necessary for further advancement of nursing education, which need legislative action. While this subject seems to be fundamentally a League problem, it pertains to public health nurses also because, if we really function to any great degree in the community, matters of legislation will affect us materially.

The purpose of the League is the advancement of the education of the nurse. First, it is interested in the preparation of women in the "knowledges, skills, technics and qualities needed by everyone who is to give good nursing care, and second, in the further preparation required by those who would enter special forms of nursing service." Briefly then, its objects are service, higher education, and research. It attempts to determine and make possible the best education of the workers, and to promote better nursing service of all types.

The problems of today differ tremendously from those of the past. Now complicated treatments, diets and preventive measures require special skill. The committee grading schools of nursing will endeavor to show in what degree the skill is being provided, and bring to light one aspect of the nursing situation with which the League is greatly concerned; namely, the laws regulating the practice of nursing.

One of the earliest steps taken by the League was the establishment of a uniform curriculum—including qualifications, examinations, and percentage of excellence required, so that a universal standard might be maintained. Like everything else today, standards must be progressive to meet the ever changing needs, and legislation can keep them progressive.

In a few states, the law requires 8 grades of elementary school before a girl may enter a school of nursing; in others, she may enter after 1, 2, or 4 years of high school; while in 4 states the matter of education is left to the decision of the Board of Nurse Examiners.

The board sets up standards in the majority of states; inspects the schools; determines what shall be an accredited school; sets the examinations; and rates the candidates for the license to practice. The board may be composed entirely of nurses; the majority of its members may be nurses and the others physicians; the majority may be physicians and the others nurses; in 1 state, the board is composed wholly of physicians; and in another it is made up of nurses and one lay member. The law prescribes the professional qualifications

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of the nurses on these boards, which range from graduation from a nursing school, to 5 years of educational work with nurses. This legal provision is meager, and a study of the individual qualifications of each member would be revealing.

Although we should be vitally interested in the amount and character of the clinical material provided for students, what is asked for in the laws is indicated by the bed capacity of hospitals, and the daily average of patients accepted.

Affiliations for the smallest schools with larger schools are not required by law in certain states. The Red Cross found this to be true when it penetrated the less populated areas, and accredited schools were stimulated to increase their service through affiliation, but this is by no means general.

There is great variation in the laws concerning the length of training which nurses shall have. Some states set 2 years as a minimum; others, 2 years and 4 months; while still others require 3 years in a hospital, thus making it impossible to add public health experience or give credit for college work. Where only minimum educational experience can be given, a minimum amount of time should be required.

There should also be a law requiring all those who nurse for hire to be licensed.

A national examining board, such as the American Medical Association evolved in 1915, would be helpful in solving the reciprocity question and in clarifying the standards of nursing education, and it would be the first step toward reciprocal relations with other countries.

To sum up, there are three important objectives to attain, which will require the combined help of the three national nursing associations; namely, the elevation of standards through the states, compulsory licensing, and provision for a national examining board.—Elizabeth C. Burgess, R.N., Advancement of Education through Legislation, *Am. J. Nurs.*, 29, 7: 765 (July), 1929.

M. A.

The Public Health Nurse's Lost Opportunity—Everyone realizes that the public health nurse in a community usually has easy entrée into the homes of her patients, and this is half the battle in doing preventive health work; but if when she gets into the home she is not observant and does not take opportunities to teach the family or individual members of it better ways of safeguarding their health, half of her effectiveness has been lost.

For instance, a new, well trained nurse interested in how the public health nurses in a community carried on their work accompanied several of them on their daily rounds. The first one was intelligent, a high school graduate, and had been in her position for several years. She had been asked by a school teacher to look into the condition of two of her pupils. One, a girl about 11, had poor vision, and her brother, age 8, could not talk plainly, and the teacher felt that he might be of retarded intelligence. The nurse had already made several visits to this family and had managed to get these two children put under a physician's treatment.

On this particular visit the observer noted that there were three other children in the family, including a baby 1 year old, walking with very bowed legs, and showing other indications of malnutrition.

The mother herself was very frail and looked haggard and worn. She casually mentioned that she had had malaria shortly before the baby was born, and that her mother had died of "consumption."

The nurse, despite the fact that she should have considered the family as a unit, was intent upon only one thing—

to get the necessary blanks filled out which would insure treatment for the two children whom the teacher had referred to her. Not a word was said about the physical condition of the mother, or whether she had recently or ever had a good physical examination. No question was asked about the baby's food, or the amount of sunshine or fresh air he got. The child welfare station in the community was not mentioned. Apparently in all her visits the nurse had never thought of mentioning these matters. The mother was grateful for what the nurse was doing for her two children; she was friendly and receptive—all the more reason the nurse should have seized her opportunity to do something constructive for her and her baby.

This is only one illustration out of many. In looking into the qualifications of this nurse it was found that she had had no theoretical training in public health nursing, nor had she had more than 6 weeks' experience in public health nursing under supervision while in training. For several years she had been working without supervision.

The *Appraisal Forms* of the American Public Health Association for both rural and city health work have set up standards for the number of visits a public health nurse should make in behalf of infants, preschool children, school children, tuberculous cases, communicable disease cases, and others; but what assurance is there that, even if the organization puts forth the effort to get the required number of nurses to make all these visits, the quality of their work will be such as to justify the effort?

Nowadays at least a year on the staff of a good public health nursing association or health department, under a well trained supervising nurse, is necessary. A young nurse just beginning public health nursing work is pitifully lacking in observation of the needs, or opportunities to teach health lessons in the homes of her patients. That ability must come through gradual training, through a supervisor who accompanies her on her visits and, in a constructive way, brings out points in the visit that the nurse would never think of, and through staff conferences and demonstrations both in the office and in the home. To get a broader perspective of public health in all its phases, at least 4 months of theory in one of the universities offering an approved course in public health nursing is necessary.

Nor can we be sure that the nurse even under supervision has had the right training unless we look into the experience and training of her supervising nurse, of the director of the teaching center (if there is one), and of the nurse director of the whole staff (if the organization is large). They, too, require both practical and theoretical training to get the full perspective and broad point of view their positions demand. The National Organization for Public Health Nursing can help out here, if anyone is in doubt.

Until all these requirements are met there will be many nurses doing public health nursing in communities who are not real public health nurses, because, while they may be adept at the mechanics of nursing, they lack the vision to see the family behind the patient and the community behind the family, which characterizes the good health teacher; and Mary S. Gardner says that it is principally as a teacher that the public health nurse has justified her existence.

A New Course for Public Health Nurses—At the present time there are in the United States 11 courses for public health nurses which have been graded by the National Organization for Public Health Nursing as meeting certain minimum requirements in regard to technical and practical instruction. These courses are conducted in the following universities or colleges throughout the United States:

University of California, Berkeley, Calif.; Simmons College, Boston, Mass.; University of Michigan, Ann Arbor, Mich.; University of Minnesota, Minneapolis, Minn.; Teachers College, Columbia University, New York, N. Y.; Western Reserve University, Cleveland, O.; University of Oregon, Portland, Ore.; Pennsylvania School of Social and Health Work, Philadelphia, Pa.; George Peabody College for Teachers, Nashville, Tenn.; College of William and Mary, Richmond, Va.; and the University of Washington, Seattle, Wash.

This fall the School of Nursing of Washington University, St. Louis, Mo., will offer a course in public health nursing, with the coöperation of other departments of the university and of the following organizations: Health Department of the City of St. Louis, State Board of Health Rural Teaching Center, St. Louis Visiting Nurse Association, and St. Louis Provident Association.

Negotiations for affiliations with other agencies will proceed as rapidly as possible.

The announcement continues:

The purpose of the course is to prepare qualified nurses for positions in the various fields of public health nursing.

Completion of the prescribed course will entitle the student to a Certificate in Public Health Nursing.

Requirements for Admission

1. Graduation from an accredited high school

2. Graduation from a course in nursing extending over a period of at least 2 years, conducted by a school of nursing connected with a hospital which has a minimum daily average of 30 patients during the candidate's period of training, and which provides experience in pediatrics, obstetrics, and medical and surgical nursing of men and women

3. State registration

(If a nurse meets the above requirements, she will also be eligible for membership in the National Organization for Public Health Nursing.)

4. Satisfactory condition of health as determined by a medical examination made by the University Health Service

Plan of Work

The program will cover one academic year of two semesters, a period of about 9 months. Registration begins September 19, 1929.

The first semester will be given chiefly to classroom work, assigned reading, lectures, and excursions. Courses in educational psychology, social science, public health nursing, mental hygiene, and public health and hygiene, totalling 17 semester hours, will be required.

The second semester's work will consist chiefly of field experience with health and social agencies, including special demonstrations, conferences, home visiting, clinic experience, and excursions. The selection of field work will depend somewhat upon the student's previous experience and her purpose in taking the course.

It is hoped that when the course is graded by the National Organization for Public Health Nursing, it will be put on the list of those approved by that organization.

Hitherto, there has been a large stretch of country between California and Washington and Minnesota and Tennessee without a course of this kind, and it should fill a long felt need.

REFERENCES

Courses in Public Health Nursing for Graduate Nurses—National Organization for Public Health Nursing, New York, N. Y.

Public Health Nursing Course—Washington University School of Nursing, St. Louis, Mo.; Sept., 1929–June, 1930.

EDUCATION AND PUBLICITY

EVART G. ROUTZAHN*

"Too Much, or Too Little"—Thus *Editor and Publisher* characterizes a type of investigation publicity which sometimes tempts health agencies. A few weeks ago health officials reported that 9 of the 90 varieties of lipstick on the market "contained benzol, a chemical with puzzling and often dangerous reactions on human tissue. Face powders contained lead. Hair dyes did their job through the agency of a chemical containing most of the alphabet and heaven knows what else, but certainly poisonous. A few days previously, the seizure of a large quantity of impure and therefore deadly ether was reported from Boston." The editorial states the newspaper's interest in protecting its clientele and in keeping out advertisements of "merchandise branded as harmful by responsible public authority."

"Nine of the 90 lipsticks contain poison—but which 9? Some hair dyes perform with chemicals of baffling title and character—but is the article condemned on the front page the same one extolled in back-page advertising? No publisher knows. No reader knows.

"The inspectors who seized the adulterated ether in Boston mentioned no names. Neither did the New York cosmetic detectives. Amazingly, they protected the swindler and the potential poisoner, but slandered by implication every reputable competitor.

"It may be that the commercial chemists need a thorough going-over in the public interest and a few jail terms for conscienceless exploiters of human trouble. But it is sure that neither the industry nor the public will gain by investigations and seizures with a front page column as net tangible result and freedom to the offenders to continue their twisting in the hope that officialdom comes up for air only 'so often.'"

Do We Know What They Want?—Do we know what girls will read, and what will influence their health habits? These questions are prompted by a strikingly well done pamphlet of 16 pages addressed to girls—"It"—And How! written by Margaret Breen and issued by the Minnesota Public Health Association, 11 W. Summit Ave., St. Paul, Minn. *10 cents.*

In its aim of appealing to the desire to be popular "It" is certainly sound. We should think it would be successful, but if one could get the reactions on some of the more thoughtless young people who most need the advice it contains, it would be worth a lot more than anything health workers may say about it. Try-outs of the pamphlet conducted by someone not concerned with writing or publishing the pamphlet, and skilled in getting at the real attitudes of girls would be valuable.

In the frank use of an appeal to which we older people think girls will respond, in its lively and attractive illustrations, readable type, and good writing, "It" stands out from the mass of popular health publications. Some of the rather extravagant phrases are open to criticism. For example, on page 3, "without 'It' you are lost for you cannot keep up with the rest and you will be ignored," etc. All this, of course, is putting it rather strong.

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

Everyone concerned with public health education will wish to examine a copy, and probably many will try out a few copies for their own satisfaction. The editor hopes to receive some reports on the results.

This Same Question—Do We Know What's What?—is raised by The Kewpies Health Book, written and illustrated by Rose O'Neill—published by National Tuberculosis Association, 370 7th Ave., New York, N. Y. 5 cents; 100 for $2.00. It was an achievement to secure this 6-page folder from the creator of the Kewpies. Intended especially for use in kindergarten and primary grades. Kewpie fans, young and old, will love it. Mothers and nurse-maids will welcome it. It is something to slip into Christmas packages for children. Will it teach health habits? Who knows? But let's try it out.

National Publicity Groups—Paul Bliss, St. Louis Community Chest, 2221 Locust Street, St. Louis, Mo., is chairman of the Social Work Publicity Council. The executive committee includes: Frank Kiernan, Massachusetts Tuberculosis League; Katherine W. Whipple, New York Tuberculosis and Health Association; Virginia R. Wing, Cleveland Health Council.

Charles C. Stillman, Ohio State University, Columbus, O., is chairman of Educational Publicity Division, National Conference of Social Work. Bernard C. Roloff, Chicago Department of Health, and Virginia R. Wing, Cleveland Health Council, are members of the executive committee.

The next meetings will be in Boston, late spring of 1930.

TIMELY TOPICS

You will find unusually good leads for newspaper interviews and for paragraphs for your house organ in some of the changing customs and topics of general discussion offered during the past season. For example:

"The Hollywood Diet"—see editorial and "If You Want to Lose Weight," in *Better Health*, Dept. of Health, Syracuse, N. Y., Aug., 1929. *Free.*

A lively editorial, "The Eighteen Day Diet," appears in *Hygeia*, Sept., 1929. An abbreviation, "Hygeia Explains Hollywood Diet," is supplied free in *Hygeia Clip Sheet*, Sept., 1929. *Free.*

The problems of mechanical refrigeration are concisely outlined in *Health News*, U. S. Public Health Service, Washington, D. C. Ask for F-31-A. *Free.*

The past summer brought widespread discussion of the follies of men's clothing. Material for future use includes "What Is Rational Clothing?" answered in three mimeographed pages by League of Red Cross Societies, 2, Avenue Velasquez, Paris 8, France; and a radio talk by Dr. G. W. Goler, tells how men came to wear what they do, with a prophecy of better things. In *Health Bureau*, Bureau of Health, Rochester, N. Y., July, 1929. *Free.*

"Some 'Do's' and 'Don't's' on Ivy and Sumac Poisoning," *Clip Sheet*, Dept. of Agriculture, Washington, D. C., June 23, 1929. *Free.* Includes reference to *Farmers' Bulletin* 1166-F "as an aid to identifying the poison ivy plants and directions for treatments."

"Sun Tan Fashions Come from Switzerland, Say Tuberculosis Workers"—*Clip Sheet*, New Jersey Tuberculosis League, 21 Walnut St., Newark, N. J., July, 1929. *Free.* From Dr. Rollier to New Jersey sanatoria sun treatment. Also same *Clip Sheet*, under "The Song of the Skirt" touches on "the scanty clothing of the 1929 flapper" and quotes the old time "Song of the Skirt." (Incidentally beware of talking "flapper" much longer!)

"Modern Sun Worshipers"—Oregon

State Board of Health, July 30, 1929. Savage worship, modern tan and nonmedical use of artificial sunlight. *Free.*

In "Beauty (?) Unadorned," *Woman's Journal* (Aug., 1929) says: "Just possibly when a girl finds that her back is not nice and flat she will take corrective exercises and will develop muscles to add to her grace, but we see no sign that that is to be the result." But publicity cleverly directed may bring that result.

REPORTING

What the Chicago Tuberculosis Institute is Doing (360 North Michigan Ave.) is told in 6 large pages of pictures with captions—and no statistics. *Free.*

In contrast, the Division of Social Hygiene, New York State Dept. of Health, in *Five Years of Social Hygiene Activities Presented Graphically,* uses 9 pages of diagrams to show quickly what has been done in education, clinics and laboratory services. *Free.*

A report in miniature is that of the Community Health Assn., Boston, Mass., which received special mention in the 1929 competition conducted by the Social Work Publicity Council. Said the contest committee: "It has a neat, appealing self-enclosed cover. . . . The list of services rendered . . . gives one the impression of conciseness and yet of a broad field of service. The chart of income and expenditure is vivid and the list of what specific gifts of money will do is appealing. The photos are not as good as they should be. The cost for 5,000 was $596." *Free.*

The readable descriptive report, without statistical data, is illustrated by a Review for 1928, Rockefeller Foundation. Size, paper, type, illustrations and text in combination produce an effective publication for semipopular use. *Free.*

Again the Milbank Memorial Fund in its 1928 report illustrates what can be done to present a readable, dignified record of a year's varied health and other social activities. While not "popular" in its appeal, the report is a recognition of the right of the student and the specialist to have reference material submitted in pleasing form. For the most part, the statistical data have been reduced to simple, clear diagrams. Illustrations appear on the same antique paper as the text. Bertrand Brown, in charge of publications, is prepared to demonstrate the comparative inexpensiveness of a well-printed report. The one disappointment is the lack of an index which would add considerably to the ready usefulness of the volume. *Free.* Address 49 Wall St., New York, N. Y.

THE OFFICE

Most of our mimeographed publicity looks dull enough even when it is neatly done. Too much of it is badly done. The best single help towards better and better mimeograph work is "How to Play the Mimeograph," by Dr. H. E. Kleinschmidt of the National Tuberculosis Association. This is an illustrated mimeographed pamphlet, entertaining and practical. Good for the "boss" who does the planning, for "Sally Ann" who cuts the stencil, and "Oscar" who finishes the job. Distributed only by Social Work Publicity Council, 130 East 22d St., New York, N. Y. *Send 4 cents postage.*

If you wish a duplicate set of any list in the form of typewritten cards, or a card record of the addresses made when envelopes are addressed, or a card copy of order slips or address stickers, or a card record of persons receiving notifications or communications—all made without extra typewriting when the original is typewritten—mention the JOURNAL and ask Direct Service Co., 604 Elwood Bldg., Rochester, N. Y., to send samples of sensitized cards.

Three commemorative 2-cent stamps have been issued recently—Sullivan Expedition, Edison, and Anthony Wayne. If not available locally, can be ordered through the Philatelic Agency, Post Office Dept., Washington, D. C.—if wanted to add a bit of distinction to your mail.

CHILDREN AND SCHOOLS

"Blue Ribbon Contests in Rutherford County." *News-Letter,* Commonwealth Fund, 1 East 57th St., New York, N. Y., June, 1927. *Free.* Annual parade of blue ribbon winners; growth of interest in the blue ribbon idea.

"Education in Good Posture," by J. Mace Andress. Introduction to a series of projects, with classroom material. *Hygeia,* July, 1929. Posture plays in both July and August issues.

"Health Education in Schools in the Metropolitan Health Demonstration Area," by Nina B. Lamkin and Mary E. Du Paul. *Quarterly Bulletin,* Milbank Memorial Fund, 49 Wall St., New York, N. Y., July, 1929. *Free.*

"Teaching Health in Schools." A reprint outlining the new state program of the State Charities Aid Association, covering health protection, health teaching, and health development. S. C. A. A., 105 East 22d St., New York, N. Y. *2 cents.*

"Your Nearest 'Service Station.'" A list of various units of the National Council to which correspondence about educational material may be addressed. *The Dairy Council,* 307 North Michigan Ave., Chicago, Ill., June–July, 1929. *Free.*

PUBLICITY NEEDED

"What Price Publicity," by Elsie M. Maurer. *Trained Nurse,* June, 1929, pp. 751–755. The need of more high grade applicants for training; the need of publicity in recruiting; how interviews, talks to visitors, correspondence and other routine contacts may have a far reaching importance unsuspected at the time.

DIPHTHERIA

The Illinois State Department of Health is distributing to physicians a display card advising parents to have their children immunized.

An anti-diphtheria cartoon from the *New York Evening World* appears in *Weekly Bulletin,* New York City Dept. of Health, July 6, 1929.

"What is Diphtheria?" is a 4-page mimeographed article distributed for reproduction in all countries. League of Red Cross Societies, 2, Avenue Velasquez, Paris, 8, France.

Three short paragraphs of explanation and history in *Time,* July 29, 1929, p. 50. Also New York City's use in July of street cleaning trucks as "healthmobiles."

MAGAZINE ARTICLES

"About Face," by Ruth F. Wadsworth. *Collier's,* Aug. 10, 1929. Beauty and the liver.

"Air Raids on Mosquitoes," by S. R. Winters. *Aeronautics.* In *Literary Digest,* June 29, 1929.

"Diet and Appetite," by T. Swann Harding. *Harpers,* Aug., 1929, pp. 361–369.

"Diet and the Duration of Life," by James A. Tobey. *American Mercury,* July, 1929.

"Too Much Tooth Pulling." *Journal of Indiana State Medical Assn.* In *Literary Digest,* July 6, 1929.

RADIO

Margaret Deland broadcast for the Massachusetts Social Hygiene Society recently.

"Have You a Family Doctor?" shows how the conversational form of expression and the economical use of words may result in a highly effective radio talk. *Health,* Dept. of Health, New Haven, Conn., July, 1929. *Free.*

A group of mouth hygiene talks—habits which affect teeth, why and when to straighten teeth, results of decay, what teeth should be extracted. *J. Am. Dental Assn.*, 58 East Washington St., Chicago, Ill., Sept., 1929.

"Health Hazards of Vacation Time"—a radio talk given July 2 when most people were all agog for a vacation, with or without "hazards." But the last paragraph of that radio talk was about "Goblins." It would have made a snappy lead for the talk—especially if the title had been changed to "Vacation Goblins."—*Conn. Health Bull.*, State Dept. of Health, July, 1929. *Free.*

HOUSE ORGANS

The mimeographed *Bulletin*, Board of Health, Middletown, N. Y., carries "home-made" illustrations in every issue, and the envelope used in mailing bears a new illustrated return card for every issue. *Free.*

Having asked its readers as to the value of the *Bulletin*, National Tuberculosis Association, the responses have determined its continuance with some changes in the editorial program.

"A List of Health Magazines in the United States" classified them as national, state or local. An attempt has been made to define the contents of the different publications. National Health Council, 370 7th Ave., New York, N. Y., May, 1929. 10 cents.

"The Feet and Their Care," in *Chicago's Health*, Dept. of Health, Chicago, Ill., Apr. 30, 1929. Good material for folder and other uses. *Free.*

"Serving the Destitute Sick," *Community Fund News*, 51 Warren Ave., W., Detroit, Mich., June, 1929. *Free.* On services rendered by doctors; record of free services in connection with one hospital. Quoting such statistics in the lead of a press release would carry the rest of the story in most newspapers.

TITLES AND PHRASES

"Feeding a Crabby Husband on Hot Summer Days." *Northwestern Health Journal*, St. Paul, Minn., July, 1929. *10 cents.*

"The Hunger Strike in Infants." *Child Health Bulletin*, 370 7th Ave., New York, N. Y., July, 1929.

"Mad Dog!" *Hygeia*, August, 1929.

"Midsummer Traffic Madness"; "Canned Vitamines." *Better Health*, Dept. of Health, Syracuse, N. Y., July, 1929.

"The Misery Clinic" ("where those with unruly nerves may find help and understanding"); "The Girl Who Grew Up Too Soon" ("the serious, responsible little old man or woman"). *Hygeia*, July, 1929.

"Modern Sun Worshipers." Radio Health Talk No. 370, New York State Dept. of Health. *Free.*

"What a Baby Thinks About in Hot Weather." *Weekly Health Bulletin*, Connecticut State Dept. of Health, July 8, 1929.

"When Life Becomes a Burden" ("morbid fears of worriers and melancholics"); "The Human Mixing Bowl" (mouth hygiene). *Popular Health*, Minneapolis, Minn., June, 1929. *15 cents.*

BOOKS AND REPORTS

Teaching Health in Fargo—*By Maud A. Brown. New York: Commonwealth Fund,* 1929. 142 pp. Price, $1.50.

The tyro at reviewing who has the temerity to rush in upon *Teaching Health in Fargo* finds two pitfalls—the charm of the writing and the convincing way in which the subject is presented. Let it be repeated, Miss Brown writes. She does not grind out words, and in this respect her book is quite unique in health literature. Colorful expression, delicately humorous critical comments, and amusing illustrations in both words and pictures, all go to make the book a delight to the reader.

Then the presentation seems so rational, so obviously practical that the reviewer is tempted to sling superlatives like a school girl; so we become hypercritical and arm ourselves against the charm and persuasiveness of this little book as we subject it to caustic scrutiny. Is the conception new and worth reporting? Are the proposals sound pedagogy? Are the methods really practical under work-a-day conditions?

Certainly health educational schemes are as numerous as they are various. Projects, devices, concepts have all been tried piecemeal here, there, and everywhere. The outstanding contribution of the Fargo demonstration appears to be the wholesome teacher participation in planning as well as carrying out the scheme, for here was no predigested health educational pap jammed down the throats of mildly protesting teachers by some outside agency. This alone would make the demonstration worth reporting.

That its methods are sound pedagogically, those who have thought about health teaching will be fairly sure, for there will be found few artificial rewards to stimulate cupidity rather than health habits, and whenever tactful health educators work with normally interested, coöperative, and intelligent teachers, the methods should produce results in a measure comparable to those secured in Fargo. So we admit that caustic scrutiny fails to jar the enthusiasm of first reading. Sanitarians having to do with health teaching will enjoy and profit by this book, and they will want to get it quickly into the hands of those responsible for the health of school children if it is not already there.

RAYMOND S. PATTERSON

Stephen Hales, D.D., F.R.S. An Eighteenth Century Biography—*By A. E. Clark-Kennedy, M.D., M.R.C.P. New York: Macmillan,* 1929. 256 pp. Price, $6.00.

In 1927, Corpus Christi College, Cambridge, celebrated the 250th anniversary of Stephen Hales, and the author was selected to give the commemoration address. So much material was found that it was impossible to include it in an ordinary address, and the present work was written to complete the story of this remarkable man.

Although a clergyman, the name of Hales will always be connected with early experimental physiology and botany. He studied the ventilation of jails and ships, and devised apparatus for its improvement. His well known experiments on animals were a study of the blood pressure, and he was the first to introduce a cannula into the vessels and observe the height to which the blood would rise in a vertical glass tube. He studied the air, did re-breathing experiments, and concluded that it was through the peculiar properties of air

"that the main and principal operations of nature are carried out."

His life has particular interest for Americans because of his connection with the development of what is now the state of Georgia, which "was founded in an attempt to remedy the social conditions of England. . . . Georgia was both a philanthropic and an imperialistic enterprise."

One is somewhat astounded at the variety of his interests and the excellence of his work in each. He was perpetual curate of Teddington, and served that living for more than fifty years. He was a preacher of no mean ability, a plant and animal physiologist, one of our earliest hygienists and sanitarians, but in spite of all this he went wrong on a supposed cure for stone in the bladder, consisting of calcined snails, wild carrot seeds, burdock seeds, ashen keys, hips and haws, all burned to blackness, soap and honey, invented by one Joanna Stephens, though he was severe in dealing with other quacks. In this connection, he carried out a number of experiments in attempting to dissolve stones which had been removed, and in spite of his lack of success fell into the error of backing this particular cure.

As a biography, the work is exceptionally well done. The illustrations are numerous and beautiful, and prove Hales's ingenuity in devising and making such apparatus as well as his genius in working up the scientific problems. The author closes with an adaptation of words of John Wesley: "how well did science and religion agree in this man of sound understanding."

M. P. RAVENEL

Adventures in Health—*By Natalie Forbes Moulton. Boston: Little, Brown,* 1928. 140 pp. Price, $.70.

Buddie and Blossom have a series of adventures, first with the vegetables in the garden, then with animals who give them a lesson in the care of their teeth, with water and cleanliness, play times in the sunshine and numerous other incidents that indirectly teach the lessons of healthful living. This author, whose "Brownies' Health Book" has been so popular among teachers and primary grade children, has prepared another charming and interesting supplementary health reader. It has been delightfully illustrated by Eloise Burns.

ANNA B. TOWSE

Diseases of the Thyroid Gland—*By Arthur E. Hertzler, M.D. St. Louis: Mosby,* 1929. 286 pp. Price, $7.50.

Frankness, honesty and clarity are outstanding in this work of Hertzler. He is perfectly honest in stating the deficiencies in our knowledge of the thyroid, our ignorance of the etiology of even the commoner lesions, and the causes of the clinical manifestations. In stating these deficiencies, however, he opens up fields for further and new studies.

The subject matter and the material from which it is drawn are taken up by a master of pathology who in his zeal as a clinician and surgeon does not lose sight of the pathologic background—the cause of the disease, its manifestations, its progress and result. He views the problem from the point of the practical application of his science to the benefit and relief of the patient.

In studies of the thyroid, if the classification and terminology of its diseases were presented as Hertzler has done, in a clear, simple manner, there would be less confusion and misunderstanding. Clinicians and pathologists often lack in agreement of opinion concerning a thyroid, or a particular type or group of thyroids. This often does not represent a real difference, but a lack of proper understanding of these glands, and a common nomenclature and classification. Accurate clinical observations, gross and microscopic studies of the

gland should be available before a diagnosis is made on a thyroid.

It is a relief to read a present-day book on medicine in which the writer acknowledges the full value of laboratory work, but still insists upon the *tactus eruditus* of the "old school of medicine" that gave such men as Gross, Fenger and Senn.

By homely idioms and comparisons, Hertzler drives home many important facts that might otherwise receive little attention. He simplifies diseases of the thyroid to an extreme degree, yet omits none of the impressions and opinions of others whose writings often show such confusion of terms as to lose value when one tries to read, interpret and apply them.

The numerous illustrations are exceptionally good, well chosen and actually illustrate.

M. PINSON NEAL

Who's Who among the Microbes—*By William H. Park, M.D., and Anna W. Williams, M.D. New York: Century,* 1929. 302 pp. Price, $3.00.

Good Health—*By Ian S. Thomson, M.D., D.P.H. New York: Longmans, Green,* 1929. 122 pp. Price, $1.40.

There is certainly no excuse for the public to remain in ignorance of the fundamentals of preventive medicine or medicine in general, as for some years past numbers of books—good, bad, and indifferent—have appeared, written for the general public, all of them couched in language intended to be non-technical.

The book by Park and Williams is the outcome of a series of radio talks on communicable diseases and the germs which cause them. It ends with a chapter showing the application of bacteriology to the ordinary affairs of life, and contains a number of simple illustrations, most of which are good.

The book by Thomson is different from the general run, and has the advantage of being much smaller. It goes more into the symptoms of the diseases spoken of, though cause and prevention are not neglected. Thomson is the son of Professor J. Arthur Thomson, than whom there is no better expositor of the biological sciences writing in the English language. This is the first book of his which has come to the reviewer's notice, but we hope it will not be the last.

Both of these books can be recommended without hesitation to those who, without special training in biology and medicine, wish to understand the fundamental laws of health and the reasons which underlie them.

M. P. RAVENEL

Oeuvres de Pasteur—*Tome 5. Etudes sur la bière, réunies par Pasteur Vallery-Radot. Paris: Masson & Cie,* 1928. viii + 361 pp., 12 pls., 85 figs. in text. Price, 120 francs.

The fifth volume of the collected works of Louis Pasteur edited by Pasteur Vallery-Radot contains the famous monograph on the diseases of beer, the causes which induce them, and the means of preserving beer from alteration. This investigation has a significant position in the historical development of Pasteur's career and is revealed in the phrase appended to the main title of the monograph, to wit: "with a new theory of fermentation."

This investigation afforded Pasteur another opportunity to reënforce his proofs of the non-spontaneity of germs, of the non-transformation of one species of microscopic germ into another species, and gave him the occasion to monograph the yeasts associated with alcoholic fermentation.

This monograph also records a notable expansion of Pasteur's comprehension of the significance of his discoveries as revealed in his chapter on the physiological theory of fermentation. In

this he concluded that fermentation is a very general phenomenon. It is life without air; it is life without free oxygen.

It is prophetic of his later achievements to find him asking if beer and wine undergo such profound alterations because they have given asylum to invisible microscopic organisms introduced by chance into their midst where they thrive, how can one escape the thought that facts of the same order might and should present themselves sometimes in man and animals.

A few supplemental papers in this field which were published in conjunction with the monograph and in later years, are added.

The epigraph from Bossuet with which Pasteur introduced this investigation might well shed its stimulating and restraining influence in every laboratory. "Le plus déréglement de l'esprit est de croire les choses parce qu'on veut qu'elles soient." C. A. KOFOID

Who's Who in America. Vol. 15, 1928–1929—*Edited by Albert Nelson Marquis. Chicago: A. N. Marquis Co.* 2488 pp. Price, $8.50.

In this, the 15th volume of this interesting and valuable compilation of the great, the near great, the celebrated, the noted and the notorious, there are 28,805 biographical sketches of living men and women who, the publishers are careful to state, are the "best known," though not necessarily the "best," in the United States.

On the whole, the public health profession is well represented and most of those who have attained renown in the field of sanitary science seem to be included. There are, however, some peculiar omissions. One looks in vain for the names of the health commissioners of several of our largest cities, and many of the state health officers are not among the elect. This fact may or may not be to the discredit of the editors who chose the personalities worth attention, but since certain legislators and high officers of the military forces are automatically included, regardless of their achievements, sanitarians in high official places might be so favored. Perhaps they are, but changes in office are so rapid that the editors cannot keep up with them.

It is, of course, too much of a task to attempt to take a census of all the sanitarians in *Who's Who*. The reviewer has, however, counted at least 21 sanitarians among the approximately 3,000 names beginning with "B." Among the 4,000 or so members of the American Public Health Association are more than 300 whose names commence with "B." Since the proportion of persons included in *Who's Who* is about one to every 4,000 of our total population, the ratio of sanitarians seems satisfactory. There are, of course, many practitioners of medicine listed in addition; and a few osteopaths, not to mention one or two naturopaths.

Sixty-four per cent of those mentioned in *Who's Who* are college graduates, and a number of others have had some college training, which is an interesting commentary on the value of an education, and is, no doubt, one reason for the 176 pages of advertisements of educational institutions at the back of the volume.

Who's Who is a reference book which should be in every library. It is interesting reading, for the perusal of biography is always worth while and not without inspiration. The book is well printed and arranged, and apparently unusually free from errors. Sanitarians will have many occasions to consult such a work.

Some day we may also have a separate volume devoted exclusively to Who's Who in public health. It would probably cost more than it would earn as a publishing venture, but it would serve a useful purpose.

JAMES A. TOBEY

Eat, Drink and Be Slender—*By Clarence W. Lieb, M.D. New York: The John Day Company,* 1929. 193 pp. Price, $2.00.

This addition to the outpourings on how to reduce is intended for general popular consumption. As such, it is a useful book, for the style is interesting and the facts are sound, with proper emphasis on the desirability of the prospective reducer consulting his or her physician. The book is divided into three parts, the first on the three types of obesity, the second on health hazards and complications, and the third on methods of reducing. Each has numerous short sections containing much of an epigrammatic nature. Physicians and sanitarians can recommend this book to their public with comparative impunity. JAMES A. TOBEY

Nursing Mental Diseases—*By Harriet Bailey, R.N. (2d ed. rev.) New York: Macmillan,* 1929. 294 pp. Price, $2.00.

It is difficult to conceive of a treatment of this subject that could be more complete or up-to-date or more clear and simple. The first edition has been held among nurses as a standard for psychiatric nursing and there is every reason to believe the revised edition will hold the same high place among them.

From a psychological introduction the author goes on to the history of the care of the mentally sick, to some legal aspects of mental disorders, and to the prevention of mental disease, before taking up the symptoms. She quotes an eminent physician as saying, "While signs are the province of the doctor, symptoms are in a peculiar way that of the nurse." For each type of psychosis she has given the physical symptoms, the mental symptoms, then the nursing procedures, followed by very helpful hints as to the simple occupations these patients can best take part in to keep them busy and happy and assist in bringing them back to health.

There are also good chapters on therapeutic measures and hydrotherapy.

The book should not only be the stand-by of every psychiatric nurse, but of every active nurse, for different grades of mental illness appear in all classes of patients whether they are in hospitals or their own homes. Moreover, if all nurses read this book more of them would take up psychiatric nursing, for Miss Bailey has made it evident to what extent judgment, tact, emotional stability, ingenuity and human understanding are necessary characteristics of the nurses who work with those mentally diseased.

The book is written in fairly large print and is easy to read. There is a good glossary. EVA F. MACDOUGALL

Die Menschenthymus in Gesundheit und Krankheit—*Ergebnisse der numerischen Analyse von mehr als Tausend menschlichen Thymusdrüsen. Teil II. Das Organ unter anormalen Körperverhältnissen. Zugleich Grundlagen der Theorie der Thymusfunktion. Von J. Aug. Hammar. Leipzig: Akademische Verlagsgesellschaft,* 1929. xii + 1114 pp. (815 figs.) Price, 128 M.

This is the concluding volume of Dr. Hammar's monumental study of the human thymus based on 25 years of intensive study and the analysis of over 1,000 cases of critical examination of the thymus, 800 of which were after death by disease or following some abnormal condition.

The present volume opens with a discussion of the general pathological anatomy of the thymus. This is followed by a general consideration of the physiological questions arising from the anatomical and pathological conditions of the gland and experiments based thereon. The functions of the thymus as revealed by the facts thus far ac-

quired are reviewed and this is followed by a chapter on the methodology of the investigation, well worthy of consideration by all who seek to analyse the causes of disease. The greater part of the work is taken up with detailed analyses of the conditions found in the thymus following death by the more prevalent diseases from influenza to lues.

Dr. Hammar regards the thymus as essentially an epithelial organ and Hassall's corpuscles as constituting the significant part. It is in them that hypertrophy and degeneration occur. The lymphocytes in the parenchyma are invaders subject to the action of factors modifying lymphocytes generally in the body, though they are subject also to a direct correlation with the epithelial portion of the thymus. An abundance of lymphocytes is a condition of the preservation of the epithelial components and is indicative of normal function.

The histological analysis and experiments based thereon lead to the conclusion that Hassall's corpuscles increase under the stimulus of certain toxins exogenous and endogenous in origin. The physiological evidence indicates that the thymus exercises a protective action against certain toxins.

C. A. KOFOID

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH. D.

The I. C. N. Congress—A résumé of the meetings of the Montreal Congress of the International Council of Nurses includes brief excerpts from some of the important papers.

AXON. The Congress of the International Council of Nurses. Pub. Health Nurse, 21, 8: 397 (Aug.), 1929.

Tetanus and Vaccination—Tetanus occurred in conjunction with vaccination only when some type of dressing was strapped to the arm. Deep implantation of the bacillus is necessary, which is permitted by a tight dressing. Openly treated vaccinations are free from this complication.

ARMSTRONG, C. The Rôle of the Vaccination Dressing in the Production of Postvaccinal Tetanus. Pub. Health Rep., 44, 31: 1871 (Aug. 2), 1929.

Good Shoes—Why feet go wrong and how they can obtain relief through good shoes is the theme of this uninspired series of wordy paragraphs.

BUKA, A. J. The Foot and the Shoe. J. A. M. A., 93, 6: 445 (Aug. 10), 1929.

Physical Defects and Intelligence—Physical examinations of more than 14,000 retarded school children in Massachusetts demonstrate the positive association, between the factors of physical defect and lower level of intelligence. Excellently illustrated with graphs.

DAYTON, N. A. The Relationship between Physical Defects and Intelligence. New England J. Med., 201, 6: 245 (Aug. 8), 1929.

Malaria Control Measures—Briefly reviews present-day methods for malaria control.

WILLIAMS, L. L., JR. Current Malaria Studies with Special Reference to Control Measures. Pub. Health Rep., 44, 33: 2001 (Aug. 16), 1929.

Health Nursing Problems—How to extend nursing service, to coöperate with fellow workers, to establish permanency, and a half dozen other important questions are presented and discussed ably in this paper.

GARDNER, M. S. Modern Problems in the Public Health Nursing Field. Pub. Health Nurse, 21, 8: 413 (Aug.), 1929.

Tests for Syphilis—The League of Nations conducted a competition to allow the proponents of the many diagnostic tests to demonstrate the advantages of each. At the conclusion, the conference recommended that two tests be used.

KAHN, R. L. The League of Nations Conference on Laboratory Tests for Syphilis. J. A. M. A., 93, 5: 351 (Aug. 3), 1929.

Wassermann or Kahn?—Another comparative study of the Wassermann (Kolmer modification) and Kahn leads these authors to believe that the Kolmer-Wassermann test is the more accurate, but both tests are recommended.

MCINTYRE, M. C., and GILMAN, R. L. Serologic Studies. J. A. M. A., 93, 5: 358 (Aug. 3), 1929.

Toxin-Antitoxin or Toxoid—The authors are of the opinion " that toxoid merits the preference in the choice of an immunizing agent in the prophylaxis of diphtheria." Score another for toxoid.

WEINFELD, G. F., and COOPERSTOCK, M. Comparative Effects of Diphtheria Toxoid and Toxin-Antitoxin as Immunizing Agents. Am. J. Dis. Child, 38, 1: 35 (July), 1929.

Impounded Waters—Should boating, bathing, fishing be permitted in impounded reservoirs? The author's opinion is that a freer use than is usually the practice may be allowed, providing precautions are taken.

ROSENTHAL, H. The Protection of Impounded Reservoirs. J. Am. Water Works A., 21, 8: 1054 (Aug.), 1929.

Industrial Tuberculosis—Chest injury, either trauma or by diseases related to injury, usually is the cause of the development or reactivation of the tuberculous process in industrial cases.

SHIPMAN, S. J. Industrial Tuberculosis. J. A. M. A., 93, 4: 257 (July 27), 1929.

Economic Status and Disease—Statistics are presented which show, what every sanitarian believed, that the illness rate is higher among the poor and that such people get less medical attention. Well, these figures will serve many a perplexed orator who is in need of just such help for his cause.

SYDENSTRICKER, E. Economic Status and the Incidence of Illness. Pub. Health Rep., 44, 30: 1821 (July 26), 1929.

Evaluating Sanitary Progress—The enthusiast who rushes in to " prove " the value of his pet panacea should read this sane discussion of the progress in public health.

ROATTA, G. B. Developments in the Public Health Field. Pub. Health Nurse, 21, 8: 403 (Aug.), 1929.

Early Symptoms of Tuberculosis—Cough, easily tired, loss of weight, appetite, pain in chest were the early symptoms most commonly met in an examination of 1,500 patients. Though these symptoms spurred the patient to be examined, physicians were frequently unable to establish a positive diagnosis.

WILLIAMS, L. R., and HILL, A. M. The Appearance of the Symptoms of Tuberculosis. J. A. M. A., 93, 8: 579 (Aug. 24), 1929.

Contributions of Hermann M. Biggs—The sanitary advances of the past fifty years and the leadership of Hermann M. Biggs are ably portrayed in this delightful memorial lecture.

WINSLOW, C.-E. A. The Contribution of Hermann M. Biggs to Public Health. Rev. Tuberc., 20, 1: 1 (July), 1929.

HEALTH DEPARTMENT AND OTHER REPORTS

IRA V. HISCOCK

East Orange, N. J.—The new health department building, according to the 1928 report, is one of a group of city buildings which form a civic center. Plans have been made for administrative offices to house the commissioners and health officer, the sanitary inspection, nursing, vital statistics and communicable disease divisions, and also for a completely equipped laboratory, and two principal clinics—one for the care of infants and children, the other for adults, including food handler examinations, venereal disease diagnosis and treatment, and such other functions as may develop in the future. As a means of enlarging the educational activities of the department, a small assembly hall will be available for lecture and conference purposes.

During the year standard swimming pool regulations have been prepared, and rules have been adopted for the quarantine of persons exposed to chickenpox and mumps, and for discontinuing the destruction or fumigation of books from quarantined premises. Health practices, based on the *Appraisal Form*, score 848 out of a possible 1,000 points.

The estimated population of the city is 68,764, and the figures are classified by wards, color, and nationality. Of 931 births, 74 per cent occurred in hospitals, while only 4.9 per cent were attended by midwives. While the native white parents constituted 82.5 per cent of the population, only 63.3 per cent of the births belong in this group. A death rate of 9.8 per 1,000 population compares with 9.0 in 1927, and 11.8 for the years 1914–1918. Of the total 681 deaths, 73.3 per cent were in the age group 45 years and over. An infant mortality rate of 43 per 1,000 births is noteworthy. There were only 21 deaths from tuberculosis, including residents who died in distant sanatoriums and out of town institutions, giving a specific rate of 31 for the year.

Data are presented to show the results of medical examination of food handlers under the provisions of the local ordinance.

While the value of this work from the point of view of actually preventing infection from foodstuffs may be questioned, there can be no doubt that the discovery of these chronic defects is of the greatest value to the individual concerned, and the elimination of those suffering with skin infections of any kind is certainly a sound hygienic and esthetic requirement. The fact that for the first time no skin infection or syphilis was discovered during the year would seem to indicate that such persons, knowing the requirements in this city, no longer apply for employment here, or that the employers themselves are more particular whom they engage.

Baltimore, Md.—This city reports a population in 1928 of 830,370, a birth rate of 19.06, and a death rate of 14.36. Extensive statistical tables indicate the trends of disease for the past 9 years. The Bureau of Communicable Diseases reports special work in culturing convalescent cases of scarlet fever with a view to lessening the quarantine period, but thus far it is the impression that the present period of 21 days cannot be shortened. Special culture methods devised for whooping cough cases are considered of some value both in the diagnosis of and release from quarantine of cases of whooping cough. A large number of examinations of urine and feces, mainly of food handlers, has resulted in

the detection of some typhoid and paratyphoid carriers and their elimination as food handlers.

Two interesting outbreaks of food poisoning are reported, one traced to chicken salad and affecting 27 out of 29 persons, characterized by violence of onset and great prostration of the victims; the other traced to chicken patties served at a church supper, affecting 140 persons and characterized by cramps and diarrhea, without prostration. In both cases organisms of the *Salmonella* group were isolated. In both cases the chicken had been cooked at least one day before serving and had been kept without proper refrigeration or adequate protection from contamination.

The outstanding epidemiological occurrence during the year was a wave of poliomyelitis representing the greatest incidence since 1916, a total of 126 cases being reported. There was an early seasonal incidence, with an abrupt decline about September 1, and a low fatality rate. Investigations showed that more than half of the cases received hospital care; 83 cases received serum; of 49 cases given serum before paralysis, 94 per cent entirely recovered; by February 1929, more than half of all the cases had entirely recovered.

This report of 276 pages contains a table of contents at the front and an alphabetical index at the back. It is well printed and carefully prepared.

BOOKS RECEIVED

THE ROAD TO HEALTH. By C.-E. A. Winslow. New York: Macmillan, 1929. 151 pp. Price, $2.00.

THE MODERN DANCE OF DEATH. By Peyton Rous. New York: Macmillan, 1929. 51 pp. Price, $1.00.

RECENT ADVANCES IN PULMONARY TUBERCULOSIS. By L. S. T. Burrell. Philadelphia: Blakiston, 1929. 215 pp. Price, $3.50.

OUTLINE OF PREVENTIVE MEDICINE. For Medical Practitioners and Students. Prepared under the Auspices of the Committee on Public Health Relations, New York Academy of Medicine. New York: Paul B. Hoeber, 1929. 398 pp. Price, $5.00.

THE COMMON HEAD COLD AND ITS COMPLICATIONS. By Walter A. Wells. New York: Macmillan, 1929. 225 pp. Price, $2.75.

EAT AND BE HAPPY. By Josiah Oldfield. New York: Appleton, 1929. 115 pp. Price, $1.50.

STORIES OF HEALTH AND HAPPINESS. By Elizabeth B. Jenkins and C.-E. A. Winslow. New York: Merrill, 1929. 163 pp. Price, $.68.

PHYSICAL WELFARE OF THE SCHOOL CHILD. By Charles H. Keene. New York: Houghton Mifflin, 1929. 505 pp. Price, $2.40.

EAT, DRINK AND BE SLENDER. What Every Overweight Person Should Know and Do. By Clarence W. Lieb. New York: Day, 1929. 194 pp. Price, $2.00.

HEALTH EDUCATION TESTS. SCHOOL HEALTH RESEARCH MONOGRAPHS No. 1. By Raymond Franzen. New York: American Child Health Association, 1929. 70 pp. Price, Paper, $.60; Cloth, $.90.

SEVEN STANDARD CAPACITIES, 1930. Pfeatherwaite Truck Tank, Bulletin 707. Rochester: The Pfaudler Co., 1929.

COMBINED SINUS AND DUODENAL INFECTIONS. By S. Peskind. Cleveland: Author. 20 pp.

ARCHIVES DE HYGIENE. 1927, 1928 and 1929. Publicacao do D. N. de Saude Publica, Rio de Janeiro.

OEUVRES DE PASTEUR. TOME V. ETUDES SUR LA BIERE. By Pasteur Vallery-Radot. Paris: Masson et Cie, 1928. 357 pp. Price, 120 Fr.

PRACTICAL HANDBOOK FOR DIABETIC PATIENTS. By Abraham Rudy. Boston: Barrows, 1929. 180 pp. Price, $2.00.

NEWS FROM THE FIELD

RABIES

SHIRLEY W. Wynne, M.D., Health Commissioner of New York, N. Y., warned the people recently that a bite is not necessary in order for a dog to transmit rabies. The germ is carried in the saliva, and if a person touches the saliva of a rabid dog, he is exposed to the disease.

Dr. Wynne also asserted that it is a mistake to kill all dogs suspected of having rabies. "The animal should be isolated and observed. If he lives a week, it is a certain indication that he is not rabid."

CHILD HYGIENE IN MEXICO

FOR the purpose of combating infant mortality, which in Mexico City is 280 deaths per 1,000 live births, and is even higher in other parts of the country, the federal government issued a decree on May 10, 1929, establishing a Bureau of Child Hygiene (Servicio de Higiene Infantil) in the Federal Department of Public Health.

NATIONAL SCHOOL OF PUERICULTURE

IN Mexico City, a "national school of puericulture" is to be established for teaching care of the child to graduate physicians, medical students, and laymen. Special courses are also to be given for public health officers, employees of the child-hygiene clinic, and visiting nurses.

MILBANK MEMORIAL FUND AIDS EAST HARLEM HEALTH CENTER

THE Milbank Memorial Fund has donated $50,000 to the East Harlem Health Center toward the new 16-story health center, combining an apartment house with completely equipped clinics. This building has been planned by the health center.

OHIO HEALTH COMMISSIONERS

THE Tenth Annual Conference of the Ohio Health Commissioners and the Fourth Annual Meeting of the Ohio Society of Sanitarians will be held at the Neil House, Columbus, O., on November 19 to 22 inclusive. The program of the Ohio Society of Sanitarians has tentatively been allotted to Wednesday afternoon and evening, November 20, and Thursday morning, November 21.

MEASURES AGAINST ILLITERACY IN CHILE

THE President of Chile in his message to Congress of May 21, 1929, discussed, among other things, illiteracy in that country. He spoke of his intention to present to Congress a bill aiming to reduce illiteracy and urged the citizens, particularly employers, to do their share in the promotion of primary education.

In the last year 100 million pesos were appropriated for primary education, and a contract was made with a United States firm for the construction or repair of nearly 600 schools within a period of 5 years.

WORLD MEDICAL CONGRESS

THE thirteenth triennial meeting of the International Physiological Congress took place in Cambridge, Mass., August 19 to 23.

Delegates numbering more than 1,000, from every quarter of the civilized world, were in attendance. Prof. William H. Howell of the Johns Hopkins University was the president of the congress.

This was the first time this group has met in the United States, and it was officially the guest of the American Physiological Society and the Federation of American Societies for Experimental Biology.

INTERNATIONAL ASSOCIATION FOR THE PREVENTION OF BLINDNESS ORGANIZED

WORD has been received from Scheveningen, Holland, of the formation of an international association for the prevention of blindness, following the meetings of the International Ophthalmological Congress. The League of Red Cross Societies recently made public the report of a 2-years' study of the prevalence of blindness and the principal causes for loss of vision throughout the world, which was made in coöperation with the National Society for the Prevention of Blindness. This was largely instrumental in the formation of the international association.

PERSONALS

DR. THOMAS O. LUCKETT has been appointed Health Officer of El Centro, Calif., to succeed Dr. F. A. Burger.

DR. MAY I. MILLBROOK, of Biwabik, Minn., has been appointed medical adviser to women at the University of Illinois.

DR. JAMES N. BUCHANAN has been appointed Health Officer of Freeport, Ill. He succeeds Dr. Elmer H. Best, who died recently.

DR. GEORGE D. HEATH, JR., who was Health Commissioner of Bloomington, Ill., has been appointed Health Commissioner of Florence, S. C., which position was left open through the death of Dr. Percy H. Brigham.

DR. HAROLD HERMAN ASH, of Reynolds, Ind., is the new Health Officer of White County, Ind.

DR. ENRIQUE HUG has been elected professor of pharmacology in the Faculty of Medicine of Littoral, which is a branch of the faculty of Rosario, Buenos Aires.

DR. FRED BIRD, Melbourne, Australia, died on May 29. He was a prominent surgeon of Melbourne.

DR. MELVILLE G. DANSKIN, Glendive, Mont., was elected president of the Montana Public Health Association on July 16.

DR. LEON BANOV, of Charleston, S. C., has been elected president of the South Carolina Public Health Association.

DR. JOHN FERGUSON of Toronto, Canada, was elected president of the Ontario Medical Association.

DR. CHARLES J. C. O. HASTINGS has resigned as Medical Officer of Health of Toronto, Canada. Dr. Hastings has served for 19 years.

CONFERENCES

Oct. 7–9, International Assn. of Dairy and Milk Inspectors, Memphis, Tenn.

Oct. 14–18, American College of Surgeons, Chicago, Ill.

Oct. 21–23, Missouri Water and Sewerage Conference, Chillicothe, Mo.

Oct. 21–25, Inter-State Postgraduate Medical Association of North America, Detroit, Mich.

Oct. 22–24, New York State Nurses' Association, Buffalo, N. Y.

Oct. 24–26, International Association of Milk Dealers, Toronto, Can.

Nov. 4–7, 8th Annual Meeting of the American College of Therapy, Chicago, Ill.

Nov. 11–13, National Society for the Prevention of Blindness, St. Louis, Mo.

Nov. 20–22, Southern Medical Association, Miami, Fla.

Dec. 3–5, 7th Texas Sanitary Short School, Edinburg, Tex.

Dec. 6–7, New Jersey Public Health and Sanitary Association, Asbury Park, N. J.

Dec. 25–Jan. 1, Society of American Bacteriologists, Ames, Ia.